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EVALUATING THE DISCREPANCY BETWEEN INTENDED AND ATTAINED VOCATIONAL SKILLS IN TANZANIA: AN ANALYSIS OF EFFECTIVENESS AND ALIGNMENT IN MARA REGION

ОЦІНЮВАННЯ РОЗБІЖНОСТІ МІЖ БАЖАНИМИ ТА ЗДОБУТИМИ ПРОФЕСІЙНИМИ НАВИЧКАМИ В ТАНЗАНІЇ: АНАЛІЗ ЕФЕКТИВНОСТІ ТА УЗГОДЖЕНОСТІ В РЕГІОНІ МАРА

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ABSTRACT

Purpose. This study assesses the gap between intended and attained vocational skills in Folk Development Colleges in Tanzania's Mara region.

Methodology. Adopting a pragmatist philosophy and employing a mixed-methods, analytical cross-sectional design, data were gathered from 465 participants, including students, graduates, tutors, and industry officials. This dual approach enabled a thorough evaluation of the vocational skills curriculum's effectiveness.

Results. The results indicate a modest discrepancy of (38.28%) between intended and attained skills, while (61.72%) viewing effective implementation of vocational skills suggesting that FDCs are generally successful in equipping students with

Мета. Це дослідження оцінює розрив між бажаними та отриманими професійними навичками в Коледжах народного розвитку в регіоні Мара в Танзанії.

Методологія. Застосовуючи прагматичну філософію та змішані методи, аналітичний перехресний дизайн, було зібрано дані від 465 учасників, включаючи студентів, випускників, викладачів та представників освітньої галузі. Такий подвійний підхід дозволив ретельно оцінити ефективність навчальної програми з професійних навичок.

Результати. Результати вказують на розбіжність (38,28%) між бажаними та отриманими навичками, тоді як (61,72%) спостерігають ефективне впровадження професійних навичок, що свідчить про те, що Коледжі народного розвитку загалом успішно

relevant vocational competencies. This success is linked to competency-based learning strategies that focus on practical training. The data also reveal variability in individual experiences, influenced by factors such as the quality of instruction, availability of resources, and relevance of the curriculum to students' career aspirations. Using a Likert scale, responses were categorized into two groups: those reflecting a discrepancy (ratings of 1-3) and those indicating alignment (ratings of 4-5). This framework provided a detailed understanding of the relationship between taught and acquired skills, emphasizing the complexities involved in curriculum implementation.

Conclusions. Despite improvements in vocational training, discrepancies persist, revealing a disconnect between educational outcomes and labor market needs. The results advocate for policymakers to incorporate international best practices into national vocational education policies. This study offers valuable insights into the effectiveness of vocational education and underscores the need for responsive curriculum development.

Keywords: attained vocational skills, discrepancy, intended vocational skills, Tanzania.

навчають студентів, які опановують відповідні професійні компетенції. Цей успіх пов'язаний зі стратегіями навчання на основі компетенцій, які зосереджені на практичній підготовці. Дані також демонструють мінливість індивідуального досвіду, на який впливають такі фактори, як якість навчання, наявність ресурсів та відповідність навчальної програми кар'єрним прагненням студентів. За шкалою Лайкерта відповіді були розділені на дві групи: ті, що відображають розбіжність (оцінки 1-3), та ті, що вказують на відповідність (оцінки 4-5). Це забезпечило детальне розуміння взаємозв'язку між отриманими та набутими навичками, підкреслюючи складність впровадження навчальної програми.

Висновки. Незважаючи на покращення у професійній підготовці, розбіжності зберігаються, що свідчить про невідповідність між результатами освіти та потребами ринку праці. Результати спонукають враховувати передовий міжнародний досвід у національному напрямі професійної освіти. Це дослідження пропонує цінну інформацію про ефективність професійної освіти та підкреслює необхідність адаптивної розробки навчальної програми.

Ключові слова: отримані професійні навички, розбіжність, цільові професійні навички, Танзанія.

INTRODUCTION

The Vocational Skills Curriculum (VSC) serves as a crucial framework for equipping individuals with the necessary knowledge and skills to improve living standards globally. Research by Nyenzi (2014) emphasizes that vocational skills (VS) enable individuals to secure employment or start businesses, thereby increasing self-employment rates and fostering socio-economic development. Vocational Skills Education (VSE) is regarded as a strategic means of promoting economic growth at both personal and national levels by preparing citizens with relevant competencies. Institutions like Folk Development Colleges (FDCs) play a vital role in preparing youth for active participation in self-improvement initiatives and contributing to national socio-economic progress (Paudel, 2024).

FDCs are grassroots institutions that aim to enhance basic education and vocational skills among adults, especially in disadvantaged communities. They provide an accessible and practical alternative to traditional education systems, focusing on the specific needs of young adults who may have missed conventional schooling (Owiny, 2017). These colleges not only offer essential technical skills but also impart socio-economic knowledge fundamental for individual empowerment and self-sufficiency. By emphasizing hands-on training, FDCs bridge the skills gap in communities, enhancing local economic development and improving graduate employability (Sumra & Katabaro, 2016). Their community-oriented initiatives foster a culture of lifelong learning, encouraging individuals to actively engage in their development and the broader economic landscape.

Despite the recognised importance of FDCs, literature reveals a significant gap regarding their effectiveness in aligning the intended and attained vocational skills curriculum. While FDCs are praised for their community-based approach to education, there is limited empirical evidence assessing their success in meeting the practical needs of the labor market. Studies in various countries highlight the need for a structured evaluation of FDCs' performance in equipping graduates with relevant skills (Ng'unda, 2015). Furthermore, the disparity between the curriculum goals and actual outcomes remains under-explored, leading to questions about the adequacy of training provided and its alignment with community needs.

In Tanzania, the establishment of FDCs was intended to address the skills gap and enhance the employability of graduates. However, various challenges, such as resource limitations, inadequate training equipment, and traditional teaching methods, have hindered their potential (Anindo, 2016). The lack of trained staff and insufficient analytical frameworks for evaluating performance further complicate the situation. As a result, the effectiveness of FDCs in producing skilled workers who can contribute to national development remains questionable. This research aims to critically evaluate the discrepancy between the intended and attained vocational skills in Tanzanian Vocational Development Colleges, particularly in the Mara region, highlighting the pressing need for a comprehensive analysis of the effectiveness and alignment of the VSC.

METHODOLOGY

2.1. Research approach and design

This study utilized a pragmatist philosophy and employed a mixed-methods, Convergent parallel research design to thoroughly evaluate the discrepancy between intended and attained vocational skills in FDCs in the Mara region of Tanzania. The use of mixed methods, according to Creswell and Clark (2017) increases accuracy of the data collected from the field. A mixed approach was employed because it allows the study to use the desired methods to address the research problem (Almeida, 2018). The use of the qualitative approach focuses on a natural setting, and it employs naturalistic inquiry in collecting data for answering the research questions (Bisthoven et al., 2020).

2.2. Sampling and sample size

The study included a variety of respondents: FDC students (384), FDC graduates (58), FDC tutors (21), the college principal (3), and a chief industrial official (2), totaling 468 participants selected from three FDCs in the Mara region based on their roles in vocational skills provision for socio-economic development. This diversity among respondents is essential for providing a comprehensive perspective on the implementation of the vocational skills curriculum. Insights from each group reveal unique challenges and opportunities related to environmental and logistical factors, ensuring a well-rounded analysis that reflects the realities of both educational and industrial contexts in Tanzania. This multifaceted input enhances the study's relevance and applicability in improving vocational education.

2.3. Data Collection Methods

Data were collected through questionnaire and interview method from the respondents, whereas the analyses were made both descriptively for quantitative data while thematically for the qualitative one. Questionnaires were used for the purpose of obtaining general information from the respondents regarding the discrepancy between intended and attained vocational skills in the Folk Developments Colleges. They offer practical way of collecting data, ensuring consistency and generating meaningful insights

from diverse group of respondents. On the other hand, Interview was used for the purpose of obtaining detailed information of personal experience regarding the research problem at hand. Semi structured nature of interview was used that will be guided by an interview guide at hand. The interview session took place in the office of the participants, and only lasted for about 10 to 15 minutes for each interview session.

2.4. Data Analysis

Data was analysed using descriptive statistics by presenting the frequency and percentage to describe the numerous socio-demographic characteristics of the study participants. Then, mean value and standard deviation was calculated to understand the level of discrepancy between the intended and attained vocational skills in the folk development colleges. Since the study involved human subjects, the researcher observed all important ethical guidelines, including maintaining the privacy and confidentiality of all participants, ensuring that their identities remained anonymous throughout the study process.

RESULTS

In this study, the researcher set out to investigate the magnitude of the discrepancy between the vocational skills intended to be developed in learners and the actual skills they attained. This inquiry was fundamental to understanding the effectiveness of vocational training programs, particularly in FDCs where the alignment between educational objectives and outcomes is critical for preparing students for the workforce.

The emphasis was placed on discerning not just the existence of this discrepancy but also its extent about specific vocational skills. To achieve this objective, a four-point Likert scale was employed, allowing respondents to express the degree of their agreement or disagreement with statements regarding the attainment of particular skills. This quantitative approach provided a structured way to capture perceptions of skill acquisition, enabling a more nuanced analysis of the data.

Table 4.

Item Analysis on the intended and attained vocational skills curriculum (n=384)

Items	Level of agreements					Descriptive statistics	
	Strongly agree	Agree	No opinion	Disagree	Strongly disagree	Average	SD
Handling Workshop Safety as per OHS Rules and Regulations.	280 (72.92%)	3 (0.78%)	19 (4.95%)	30 (7.81%)	52 (13.54%)	1.88	1.52
Ability to make installation of different system	241 (62.76%)	36 (9.38%)	4 (1.04%)	23 (5.99%)	80 (20.83%)	2.13	1.66
Maintenance and repair of system and equipment.	245 (63.8%)	17 (4.43%)	34 (8.85%)	14 (3.65%)	74 (19.27%)	2.10	1.61
Leadership and Subordinate supervision as per Management Classification Authority.	190 (49.48%)	111 (28.91%)	2 (0.52%)	40 (10.42%)	41 (10.68%)	2.04	1.37

To determine the magnitude of the discrepancy between the intended and attained vocational skills, the results from the Likert scale responses were categorized into two parts. The first category included those respondents who rated the attainment of a particular skill as 1 (strongly agree), 2 (agree), or 3 (no opinion).

Their responses were interpreted as indicating the existence of a discrepancy between the intended and attained skills. The second category included those who rated the skill attainment as 4 (disagree) or 5 (strongly disagree), which was interpreted as indicating no discrepancy between the intended and realized vocational skills.

By analyzing the proportion of respondents in each of these two categories, the researcher was able to quantify the magnitude of the discrepancy. A higher percentage of respondents in the 1-3 range suggested a greater discrepancy between the intended and attained vocational skills, while those rating 4 and 5 indicated no discrepancy between the intended and attained curriculum. This approach allowed the study to gain a nuanced understanding of the extent to which the realized vocational outcomes aligned with the intended curriculum.

The item analysis of the intended and attained vocational skills curriculum further revealed a strong overall agreement among respondents regarding several key competencies.

A significant majority (72.92%) strongly agreed that handling workshop safety by Occupational Health and Safety (OHS) rules is a crucial aspect of their training, reflecting a high prioritization of safety in the curriculum. Conversely, a substantial number (62.76%) also agree on their ability to install different systems.

On the contrary, a notable number of respondents (20.83%) disagreed, indicating a potential gap in this area of skill attainment. For maintenance and repair of systems and equipment, (63.8%) of respondents agreed, yet (19.27%) express disagreement, suggesting that while training may be sufficient for many, there remain challenges for a significant portion of students.

Leadership and subordinate supervision received mixed responses, with only (49.48%) of respondents strongly agreed, indicating that this area may not be as effectively integrated into the curriculum as safety and technical skills.

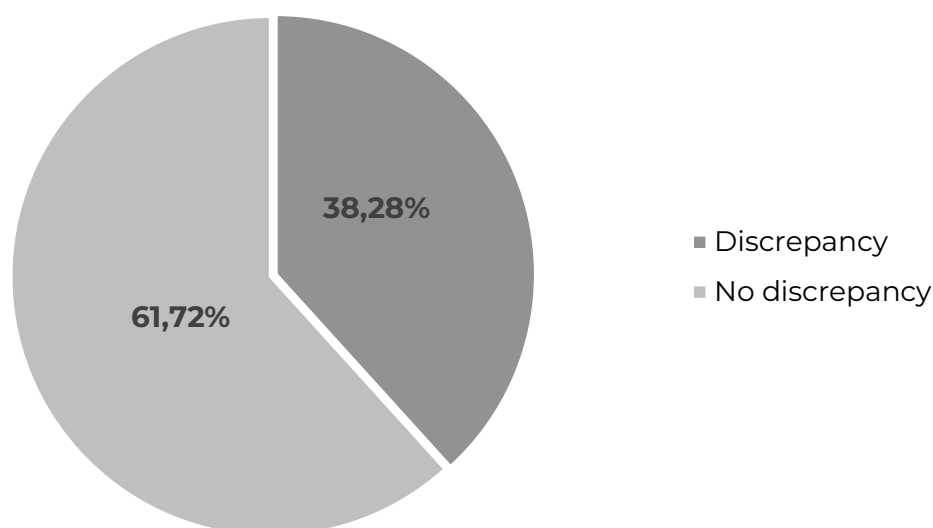
The average scores and standard deviations suggest variability in perceptions across different competencies, with safety being the most positively viewed aspect of the curriculum. In general, these results highlight the need for a more balanced approach to vocational training that not only emphasizes safety but also addresses the apparent gaps in technical and leadership skills among respondents.

Basically, the categorization of the Likert scale responses into these two distinct groups provided a clear and systematic way to measure the degree of alignment between the vocational skills that were intended to be taught and those acquired by the learners. This analytical framework enabled the researcher to move beyond a simplistic binary assessment and instead uncover the complex and multifaceted nature of the discrepancy between the planned and realized vocational education outcomes.

Figure 1 represents results on the discrepancy between the intended and attained vocational skill curriculum.

Figure 1

Magnitude of the discrepancy between the intended and the attained vocational skills curriculum



The results indicate that the level of discrepancy between the intended and attained vocational skill curriculum is relatively low (38.28%). This could be due to competency-based learning that is provided by FDCs, which exposes students to more practical sessions with hands-on knowledge and expertise applicable to real-world situations. The data implies that the FDCs are focused on equipping learners with a reasonable and relevant set of vocational skills, as stipulated in the vocational skills curriculum.

This was also supported by a detailed interview with respondent two, who provided their experience regarding the existing discrepancy between the intended and attained curriculum:

In my experience, I think the discrepancy between the intended vocational skills curriculum and the actual skills attained by students is low because we observe well-skilled students after completing their studies in different fields such as driving, carpentry, motor vehicle, etc. This means the government provides support to the development of FDCs in the provision and implementation of the intended vocational skill curriculum (FDC Principal 1).

FDC Principal 2, said:

You know, curriculum discrepancy in vocational training colleges is a result of different abilities of students in adapting to contents delivered arising from several factors. Curriculum developers may not fully align the coursework with evolving industry needs. Differences in student aptitude and lack of sufficient real-world practice opportunities can prevent mastery of the intended competencies, rapid technological changes in many fields further complicate keeping vocational programs up-to-date, resulting in a gap between the skills we teach and those demanded by employers (FDC Principal 2)

Likewise, FDC Principal 3, said:

"Thank you, in my thought on the discrepancy between intended and attained VS in FDC. As a college we are committed to equipping our students for successful careers, we recognize the importance of bridging this gap. We are actively implementing the VSC to our students to ensure they align with

industry standards and emerging trends. As a college we are enhancing partnerships with local industries to provide more hands-on training on VS for our students (FDC Principal 3).

The results, as depicted, revealed a significant individual diversity among respondents concerning the discrepancies between intended and attained vocational skills. This diversity suggests that while the study aimed to highlight an overarching trend regarding skill attainment, there were notable variations in experiences and perceptions among individual learners. Some respondents might have felt they were adequately equipped with the skills necessary for their vocational paths, while others might have perceived a substantial gap. This variability indicates that the curriculum implementation and skill development processes within FDCs are multifaceted, influenced by a myriad of factors that can lead to different outcomes for learners. Recognizing this diversity was essential for understanding the broader implications of vocational training effectiveness and the challenges inherent in achieving uniform skill attainment across a diverse student body.

DISCUSSION

The complexity of the results points to several influencing factors that could affect individual learners' experiences. For instance, the quality of instruction plays a crucial role in shaping how well students acquire intended skills; effective teaching methods can enhance understanding and practical application. Access to resources, such as training materials and equipment, can significantly impact learners' ability to practice and master skills. Personal motivation also serves as a determinant, as students who are more committed to their learning are likely to invest greater effort in skill acquisition. The relevance of the curriculum to learners' individual needs and career aspirations can affect their engagement level and the perceived value of the training. Each of these factors contributes to the unique educational journey of each learner, highlighting the necessity for a comprehensive understanding of the vocational training landscape in Tanzania (Kwambaza, 2024; Omollo et al., 2024; Rubeba, 2024).

Acknowledging the individual variability in skills attainment provides a rich avenue for insights that can inform targeted and responsive interventions designed to bridge the gap between intended and realized vocational outcomes. Rather than relying solely on aggregate-level data, which may obscure the nuanced experiences of learners, the study emphasizes the importance of incorporating individual perspectives into the evaluation of vocational training programs. By understanding the specific challenges and successes faced by different learners, educational institutions can tailor their approaches to meet diverse needs more effectively. This personalized approach could lead to improved curriculum design, enhanced teaching strategies, and ultimately, a more effective alignment between the skills that are taught and those that are truly attained, benefitting both learners and the industries they aspire to enter.

These results are partly supported by Ahmadi and Lukman (2015) in Nigeria, who viewed that an effective curriculum implementation process is fundamental for the acquisition of intended skills by learners, which can help them in their future career development. On the other hand, the results contradict what Pembe (2021) in Mpwapa and Dodoma City, who viewed as ineffective implementation of vocational skill education in the selected districts. Pembe reported that the Vocational Skills Subject (VSS) was not taught as scheduled in the vocational skills syllabus. This is because the tutors taught

two to three periods out of four per week, which marked an effective implementation of vocational skill education.

Given these results, it can be inferred that the learners receive a substantial amount of important and useful vocational skills from the various FDCs, which are likely to be beneficial for their professional, social, and economic development. This indicates a positive trend in the delivery of vocational education, where the intended outcomes are closely realized in practice, with a relatively small discrepancy between the planned and attained vocational competencies of the learners. These results are promising and suggest that the vocational skills training programs in the FDCs effectively meet their intended objectives.

The opposite was true for research conducted by Bitegera and Bisanda (2021) in Tanzania and two Asian Tiger Nations, Singapore and the Republic of Korea, which looked at how technical institutions were able to adapt to the labour market. Approximately, two-thirds of candidates lack the abilities needed in the labour market, even if colleges attempt to reduce the gap between required and attainable vocation curriculum.

Generally, the relatively low discrepancy between the intended and attained vocational skills curriculum, as shown in Figure 1, is a positive indicator of the FDC efforts to bridge the gap between their educational goals and the actual skills acquired by the learners. This implies that the FDCs have made significant strides in aligning their vocational training programs with the needs of the labour market and the aspirations of the learners.

By focusing on the delivery of relevant and practical skills, the FDCs potentially equip their students with the necessary competencies to thrive in their chosen career paths, contributing to their personal and professional development, as well as the broader socio-economic progress of the communities they serve. The results suggest that the FDCs are on the right track in fulfilling their mandate of providing high-quality vocational education that meets the evolving needs of the job market and empowers learners to achieve their full potential.

The results regarding the discrepancy between intended and attained vocational skills in FDCs revealed a nuanced landscape that resonates with similar studies conducted in various global contexts. The research indicates a relatively low discrepancy between the skills intended to be taught and those acquired by learners, suggesting that FDCs are effectively aligning their vocational training programs with labor market needs and student aspirations.

This is supported by qualitative insights from respondents who noted that well-skilled students emerged from these programs, indicating a positive trend in vocational education delivery. However, the results also highlighted individual variability in skill attainment, influenced by factors such as instructional quality, resource availability, personal motivation, and curriculum relevance. This complexity underscores the necessity for tailored interventions to address the diverse experiences of learners, ensuring that vocational training is responsive to the dynamic requirements of the workforce.

In contrast, studies from other regions present a more critical view of vocational education effectiveness. For instance, research by Pembe (2021) in Tanzania pointed to ineffective implementation of vocational skills education, whereby the curriculum was not delivered as scheduled, leading to significant gaps in skill acquisition. Similarly, Bitegera and Bisanda (2021) found that a substantial portion of graduates from technical institutions in Tanzania and two Asian Tiger Nations – Singapore and South Korea –

lacked the competencies required by the labor market, despite efforts to bridge the curriculum gap.

These contrasting results highlight the challenges faced by vocational education systems in different contexts, emphasizing that while some institutions may successfully align their training with industry needs, others struggle with implementation and relevance. This disparity suggests that the effectiveness of vocational training is not solely dependent on curriculum design but is also significantly influenced by local educational practices, resource allocation, and the responsiveness of institutions to evolving labor market demands.

The results from the study reveal critical policy gaps that hinder the effective alignment of vocational training outcomes with the intended educational objectives in FDCs. One significant gap lies in the inconsistency between curriculum design and the dynamic needs of the labour market. While this shows a relatively low discrepancy between intended and attained vocational skills, the qualitative insights suggest that curriculum developers often fail to keep pace with rapidly changing industry requirements. This disconnection may stem from outdated curriculum frameworks that do not adequately incorporate emerging technologies and evolving job competencies, resulting in graduates who may lack crucial skills demanded by employers. Therefore, policymakers must prioritize the continuous updating of vocational curriculum to ensure they remain relevant and responsive to market demands, thereby enhancing the employability of graduates and their ability to contribute effectively to the workforce.

Another critical policy gap identified in the results of this study is the need for improved quality of instruction and resource availability within FDCs. The study highlighted how individual experiences and perceptions of skill attainment varied significantly among learners, indicating that the effectiveness of training is not uniform. It was found that factors such as the availability of training materials, access to practical learning environments, and the quality of teaching methods directly influence the outcomes of vocational education.

Following such results, policymakers should focus on enhancing teacher training programs, to ensure equal allocation of resources in FDCs and foster partnerships with industries to facilitate hands-on learning experiences. By addressing these gaps, vocational training programs can provide a more comprehensive educational experience that equips students with both the theoretical knowledge and practical skills necessary for successful careers. This holistic approach benefits individual learners as well as strengthens the overall vocational education system, making it a vital contributor to economic development and workforce readiness.

CONCLUSIONS

The current study analysis of the magnitude of discrepancy between intended and actual vocational skills further underscores the complexity of vocational training effectiveness. While the majority of respondents recognized the importance of specific skills, such as adhering to safety regulations and system installation, notable gaps in areas like leadership skills indicate insufficient integration of critical competencies into the curriculum. The overall discrepancy level, although it was relatively low, points to the effectiveness of competency-based learning. However, the disparities reported by students suggest a need for a comprehensive approach that aligns curricula with the evolving demands of the workforce. This alignment is crucial to ensure that all students achieve the competencies necessary for successful employment in their chosen fields.

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No artificial intelligence tools were used in the preparation of this manuscript.

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TRANSFORMING THE COGNITIVE CONDITIONS OF ONLINE LEARNING IN HIGHER EDUCATION

ТРАНСФОРМАЦІЯ КОГНІТИВНИХ УМОВ ОНЛАЙН-НАВЧАННЯ У ВИЩІЙ ОСВІТІ

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ABSTRACT

The current stage of higher education development is characterized by a deep digital transformation, accompanied by the active implementation of online and distance learning. The availability of information, the increase in the number of digital stimuli and multitasking significantly change the nature of the cognitive activity of higher education students, which significantly affects the cognitive conditions

Сучасний етап розвитку вищої освіти характеризується глибокою цифровою трансформацією, що супроводжується активним впровадженням онлайн- та дистанційного навчання. Доступність інформації, зростання кількості цифрових стимулів і багатозадачність істотно змінюють характер пізнавальної діяльності здобувачів вищої освіти, що суттєво впливає на когнітивні умови освітнього

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of the educational process, in particular, on concentration of attention, cognitive load, information processing and the ability to self-regulate educational activity. The growth of information noise, multitasking, the constant presence of digital distractions, and the use of artificial intelligence tools are shaping a new cognitive reality of learning that requires scientific understanding. Therefore, the task of higher education is to reorient the educational process from the transmission of knowledge to the development of students' cognitive competencies, in particular the skills of conscious thinking, concentration, information hygiene, and self-regulation in the digital educational environment. This problem becomes particularly important in conditions of long-term distance learning, which increases the cognitive load and the risks of superficial assimilation of educational material.

The **purpose** of the article is to study changes in the cognitive conditions of higher education students in online format in order to substantiate recommendations for organizing the educational process in conditions of increasing information load and digital transformation of education.

The research **methodology** is based on a combination of systemic, interdisciplinary and cognitively oriented approaches, which made it possible to carry out a holistic analysis of changes in cognitive conditions of learning in higher education in the online learning environment. In the research process, general scientific (comparative analysis, systematization, classification, generalization) and empirical methods (search, questionnaire, quantitative and qualitative analysis) were used.

The following **results** were achieved as part of the study: a theoretical analysis of modern scientific approaches to understanding the transformation of cognitive conditions of online learning in higher education was carried out; the results of a survey of bachelor's degree applicants at the National Technical University "Kharkiv Polytechnic Institute" were provided, the purpose of which was to determine the features of concentration of attention, the level of information overload, the prevalence of multitasking, and the specifics of the use of digital technologies, in particular artificial intelligence tools, in educational activities. Changes in cognitive requirements for the organization of the educational process were identified. Based

процесу, зокрема на концентрацію уваги, когнітивне навантаження, інформаційну обробку та здатність до саморегуляції навчальної діяльності. Зростання інформаційного шуму, багатозадачності, постійна присутність цифрових відволікаючих чинників і використання інструментів штучного інтелекту формують нову когнітивну реальність навчання, що потребує наукового осмислення. Тому задачею вищої школи є переорієнтація навчального процесу з трансляції знань на розвиток когнітивних компетентностей студентів, зокрема навичок усвідомленого мислення, концентрації уваги, інформаційної гігієни та саморегуляції в умовах цифрового освітнього середовища. Особливої значущості ця проблема набуває в умовах тривалого дистанційного навчання, що посилює когнітивне навантаження та ризики поверхневого засвоєння навчального матеріалу.

Метою статті є дослідження змін когнітивних умов навчання здобувачів вищої освіти в онлайн-форматі з метою обґрунтування рекомендацій щодо організації освітнього процесу в умовах посилення інформаційного навантаження та цифрової трансформації освіти.

Методологія дослідження ґрунтується на поєднанні системного, міждисциплінарного та когнітивно спрямованого підходів, що дало змогу здійснити цілісний аналіз змін когнітивних умов навчання у вищій освіті в середовищі онлайн-навчання. У процесі дослідження застосовано загальнонаукові (порівняльний аналіз, систематизація, класифікація, узагальнення) та емпіричні методи (пошук, анкетування, кількісний та якісний аналіз).

У рамках дослідження було досягнуто наступних **результатів:** здійснено теоретичний аналіз сучасних наукових підходів до осмислення трансформації когнітивних умов онлайн-навчання у вищій освіті; надано результати анкетування здобувачів бакалаврського рівня освіти Національного технічного університету «Харківський політехнічний інститут», метою якого було визначення особливостей концентрації уваги, рівня інформаційного перевантаження, поширеності багатозадачності та специфіки використання цифрових технологій, зокрема інструментів штучного інтелекту, у навчальній діяльності. Виявлено зміни когнітивних вимог до організації навчального процесу. На основі

on the generalization of the results obtained, practical recommendations were formulated for optimizing online learning, aimed at developing cognitive self-regulation skills, forming information hygiene, and supporting conscious learning in the digital educational environment.

The **conclusions** substantiate that modern online learning creates contradictory cognitive conditions, combining the expansion of autonomy with increased cognitive risks, which highlights the need to revise approaches to organizing the educational process for the purposeful development of cognitive self-regulation and conscious thinking of higher education students.

Keywords: artificial intelligence, cognitive learning conditions, cognitive load, digital technologies, information hygiene, information noise, online learning.

узагальнення отриманих результатів сформульовано практичні рекомендації щодо оптимізації онлайн-навчання, спрямовані на розвиток навичок когнітивної саморегуляції, формування інформаційної гігієни та підтримку усвідомленого навчання в цифровому освітньому середовищі.

У **висновках** обґрунтовано, що сучасне онлайн-навчання формує суперечливі когнітивні умови, поєднуючи розширення можливостей автономії з підвищенням когнітивних ризиків, що актуалізує необхідність перегляду підходів до організації освітнього процесу для цілеспрямованого розвитку когнітивної саморегуляції та усвідомленого мислення здобувачів вищої освіти.

Ключові слова: штучний інтелект, когнітивні умови навчання, когнітивне навантаження, цифрові технології, інформаційна гігієна, інформаційний шум, онлайн-навчання.

INTRODUCTION

The rapid development of digital technologies and the large-scale implementation of online learning have led to a significant transformation of the cognitive conditions of the educational process in higher education (García-Morales et al., 2021). While traditional face-to-face learning was based on a relatively stable learning environment with clearly defined time and space boundaries, the online format is characterized by openness, multi-channel and high saturation with information flows. In such conditions, the ways in which students perceive, process and comprehend educational information change, and the requirements for cognitive self-regulation, concentration of attention and the ability to think consciously increase.

It is necessary to take into account the fact that in modern society the stage has ended when the possession of knowledge as such determined the level of professional and educational success. The high level of accessibility of information through digital resources and the Internet has significantly transformed the role of knowledge in the education system (Sych et al., 2021). Under these circumstances, the key challenge is not the accumulation of information, but the ability to consciously select, critically understand and effectively use it. In these conditions, modern education is increasingly focused not on the transmission of knowledge, but on the development of the ability to intellectually process information in conditions of its excess.

The formation of information hygiene skills, in particular the ability to manage information flows, minimize the impact of information noise, and maintain concentration on educational and professional tasks, is becoming relevant for the educational process in online learning environments. The information overload of the modern environment directly affects the cognitive processes of education seekers, reducing the duration and depth of concentration, fragmenting thinking and complicating the process of meaningful learning. At the same time, online learning opens up new opportunities for individualizing educational trajectories, developing the autonomy of education seekers and using digital thinking support tools (Krylova-Grek & Shyshkina, 2021).

The ability to concentrate attention is considered one of the basic meta-competences of a modern specialist, which is directly related to the level of self-regulation, critical thinking and learning autonomy. The higher the level of uncontrolled information noise, the weaker the mechanisms of focusing attention become, which requires targeted pedagogical strategies for the development of cognitive stability.

In this context, the need for scientific understanding of changes in cognitive conditions of learning in an online environment is becoming more urgent. The study of these processes is important for the development of effective educational strategies aimed at preserving the quality of learning, developing concentration skills, information hygiene, and conscious interaction with digital technologies. The role of the teacher is to create a learning environment that promotes the formation of concentration skills, conscious perception of information, and deep intellectual work.

The **purpose** of this article is to research into the transformation of cognitive conditions of online learning for higher education students to determine pedagogical guidelines for organizing the educational process in the context of increasing information load and digitalization of learning.

THEORETICAL FRAMEWORK

The problem of information overload and its impact on the cognitive processes of higher education students in online learning is considered in both foreign and domestic literature. Online learning creates specific conditions for the formation of extragenic cognitive load, which is not directly related to the content of the educational material, but significantly affects the effectiveness of students' cognitive activity. At the same time, an excessive number of visual and informational elements of the digital educational environment can reduce the depth of understanding and contribute to the superficial processing of knowledge. A review of the cognitive load theory in the digital educational context shows that excessive external load reduces resources for deep learning (Skulmowski, & Xu, 2021).

The educational environment significantly influences the online learning process. Due to its flexibility, it enhances both the positive and negative aspects of distance learning compared to traditional face-to-face learning. Empirical evidence highlights the importance of a "low-noise" environment for maintaining attention (Liu, 2023).

At the same time, the active introduction of digital technologies into the educational process expands the possibilities of engaging students in learning and at the same time increases the risks of cognitive distraction (Hasynets et al., 2024). Digital tools that support educational activities often become factors in reducing concentration and productivity (Pérez-Juárez et al., 2023).

Cognitive limitations of attention, memory and thinking are exacerbated by constant, disparate information stimuli that arrive fragmented, unsystematic and often without logical connection between them. Even short-term digital interruptions lead to a significant decrease in cognitive efficiency. In particular, switching between media and educational documents impairs integrative processing and understanding of information (Haverkamp et al., 2024), and smartphone use negatively affects concentration and academic engagement (Deng, et al., 2024). Students who frequently switch between academic activities and non-academic digital content demonstrate superficial information processing strategies, poorer retention, and lower analytical thinking skills. Upon returning to the main task, participants typically require additional time to regain full concentration. (Kostić & Randelović, 2022). In the behavioral

dimension, overload can alter decision-making, cause avoidance strategies or superficial processing of information.

In modern conditions, the negative impact of information stress on the mental state of higher education students is increasing. This impact is especially noticeable due to the significant volume of educational tasks that must be completed in a short time, as well as due to constant information overload (Pundiev, 2024). Such redundancy is subjectively experienced as a stressful situation that reduces the effectiveness of cognitive and mental processes, activates the protective mechanisms of the psyche, and prevents full, deep intellectual processing of information and its transformation into conscious personal knowledge. (Grabovska & Musakovska, 2020).

Due to the fact that the development of intellectual capital is based on the qualitative updating of knowledge, the modern system of higher education should focus not only on the transmission, processing and accumulation of information. Its key task is the creation of new knowledge and the active transformation of information resources, performing a kind of "engineering" role in working with modern information flows. (Pshenychna, 2023).

In this context, the role of the teacher as a moderator of the learning environment, capable of forming in students a critical attitude towards digital stimuli, awareness of their impact on learning outcomes, and skills for self-regulation of behavior, is growing. The formation of such skills is a necessary prerequisite for the long-term effective and pedagogically balanced use of technologies in higher education.

METHODOLOGY

To achieve the goal, a complex of general scientific methods was applied, in particular comparative comparison, systematization, classification and generalization, as well as empirical methods – information search, questionnaires, quantitative and qualitative processing of the obtained data, which ensured the scientific validity, integrity and reliability of the research results. To study the transformation of students' cognitive conditions of online learning, a questionnaire with a Likert scale (1–5) was developed, where 1 – the student completely disagrees, 5 – the student completely agrees. The questionnaire included blocks aimed at assessing the cognitive conditions of learning, the impact of information noise, the level of cognitive self-regulation, the use of artificial intelligence tools, and the perception of transformations in the educational process.

Questionnaire structure:

BLOCK 1. Cognitive conditions of learning.

1. I have difficulty maintaining my attention for long periods of time during study sessions.
2. I often get distracted while completing study tasks.
3. The study material requires more effort from me to concentrate than before.
4. I feel information overload when studying.

BLOCK 2. Information noise and digital distractions (scale 1-5).

1. Messages in messengers prevent me from focusing on my studies.
2. Social media reduces my ability to immerse myself deeply in the learning material.
3. I often combine studying with viewing other digital content.

4. I feel tired from the constant flow of information.

BLOCK 3. Concentration and cognitive self-regulation (scale 1-5).

1. I can consciously manage my attention while studying.
2. I find it easy to focus on complex intellectual tasks.
3. I use my own strategies to maintain concentration (planning, pausing, etc.).
4. I experience a decrease in the quality of thinking when multitasking.

BLOCK 4. Use of artificial intelligence in education (scale 1-5).

1. I use artificial intelligence tools (ChatGPT, etc.) for training.
2. Artificial intelligence helps me complete learning tasks faster.
3. Using AI reduces my need for deep understanding of the material.
4. I believe that AI cannot replace the thinking work of a teacher.

BLOCK 5. Perception of learning transformation (scale 1-5).

1. Modern learning requires more concentration skills than knowledge.
2. The ability to focus is a key condition for successful learning.
3. The role of the teacher has changed from a source of knowledge to an organizer of thinking.
4. I feel the need to develop information hygiene skills.

BLOCK 6. Open questions.

1. What factors most interfere with your concentration while studying?
2. What conditions help you concentrate better?
3. How, in your opinion, should the educational process change to take into account digital challenges?

To process the results, quantitative analysis of scale data and qualitative analysis of open-ended responses were used.

RESULTS

The transformation of cognitive conditions of online learning is manifested in the increased influence of information noise, fragmentation of attention, increased multitasking, and a decrease in the depth of intellectual processing of educational material.

Disparate information stimuli in the modern educational environment represent fragmented, unsystematic, and contextually inconsistent information signals that reach learners from various digital and communication channels and make it difficult to maintain sustained cognitive focus. Such stimuli include numerous notifications from messengers and social networks, push notifications from mobile applications, emails, multimedia content with a clip structure, as well as the parallel use of several educational platforms and digital resources during learning activities. A characteristic feature of these stimuli is the lack of logical sequence, semantic hierarchy and clear structure, which causes constant switching of attention.

From the point of view of cognitive psychology, the impact of disparate information stimuli is manifested in a decrease in the ability to concentrate for a long time, superficial

processing of educational material and limited opportunities for deep understanding of information. An excess of such stimuli increases information noise, activates multitasking and leads to an increase in cognitive load. As a result, educational activities increasingly become fragmented, which negatively affects the formation of holistic knowledge, analytical thinking and cognitive self-regulation of higher education students.

The transition to a remote format has significantly increased the time spent by students in front of screens, potentially affecting their psychophysical and cognitive well-being and causing digital fatigue. identified four forms of digital fatigue (J.-M. Romero-Rodríguez, F.-J. Hinojo-Lucena, K. Kopecký, A. García-González, (2023):

- visual fatigue, associated with prolonged focus on the screen;
- social fatigue, associated with the loss of living social contacts;
- motivational fatigue, which reduces the desire to learn;
- emotional fatigue, which manifests itself through decreased emotional stability.

Digital fatigue has not only cognitive but also emotional and physiological manifestations. This phenomenon can affect:

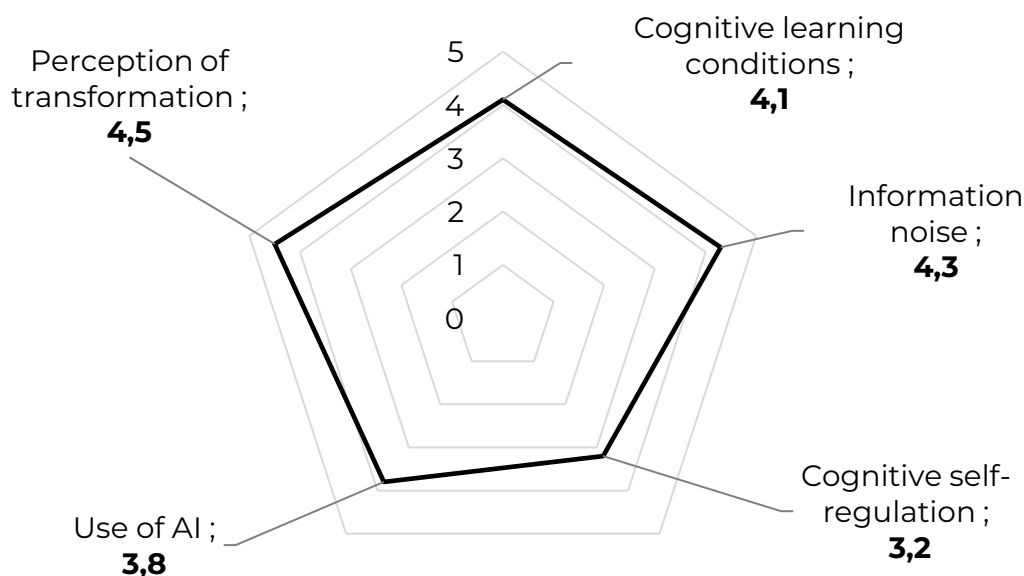
- ability to concentrate and learn;
- motivation to study;
- general well-being of students in remote mode.

One of the current components of the modernization of the educational process in higher education is the introduction of artificial intelligence (AI) tools that contribute to the individualization of learning and support of cognitive processes of students (Tverdokhliebova & Yevtushenko, 2025; Gulich, & Chetveryk, 2025). The use of artificial intelligence effectively works with formalized knowledge, completed structures and algorithmized processes. It is able to imitate the stylistic features of texts, generalize information, and quickly process large data sets. At the same time, artificial intelligence does not have a holistic worldview, value orientations and the ability to creative pedagogical thinking, which are the defining components of a teacher's activity.

The key advantage of a modern teacher remains the ability to formulate problematic, open-ended and non-standard questions, to create situations of intellectual search and pedagogical dialogue. It is precisely such tasks that contribute to the development of critical thinking, reflection and creative potential of students. Under these conditions, artificial intelligence can only act as an auxiliary tool, and not as a subject of the educational process.

To study the transformation of cognitive conditions of online learning, an online survey was conducted using Google Forms among 4th-year undergraduate students of the National Technical University "Kharkiv Polytechnic Institute" who are studying remotely. The survey is aimed at assessing the level of concentration of education seekers, the impact of information noise and the use of digital technologies, in particular artificial intelligence tools. 40 students participated in the survey.

The results were analyzed by summarizing responses on a Likert scale (1–5) and qualitative analysis of open-ended responses (Figure 1).

Figure 1*Radar Chart of Cognitive Learning Conditions Transformation (Generalized Survey Results)*

Analysis of answers to block 1 (Cognitive learning conditions) showed that most respondents experience difficulties with maintaining attention during classes. More than two-thirds of respondents (about 70%) chose values of 4–5 for statements about the difficulty of prolonged concentration and increased efforts required to process educational material. A significant part of students also noted a feeling of information overload, which indicates a change in the cognitive conditions of learning towards an increase in the intensity of information processing.

Results of block 2 (Information noise) showed a high level of impact of information noise on learning activities. Most respondents (over 75%) agreed that messages in instant messengers and social networks negatively affect the ability to deeply immerse themselves in educational material. More than half of the respondents noted that they often combine learning with viewing other digital content, which confirms the prevalence of multitasking and fragmented style of cognitive activity.

Analysis of block 3 (Cognitive self-regulation) revealed a contradictory trend. On the one hand, some students (approximately 45%) indicated the presence of their own strategies for maintaining concentration (time planning, pauses, task structuring). On the other hand, more than 60% of respondents noted a decrease in the quality of thinking in conditions of multitasking and difficulties with concentration on complex intellectual tasks. This indicates an insufficient formation of cognitive self-regulation skills in the digital learning environment.

Results of block 4 (Use of AI) showed that artificial intelligence tools are actively used by students in the educational process: about 80% of respondents confirmed their use for completing tasks.

At the same time, most respondents agreed that AI helps to accelerate the completion of educational tasks, but almost half of students noted a decrease in the need for deep understanding of the material. The vast majority of respondents (over 85%) believe that artificial intelligence cannot replace the thinking and pedagogical role of a teacher.

According to the results of block 5 (Perception of transformation) it was found that students are aware of the changing requirements for learning activities. Most respondents agreed with the statement that modern learning requires, first of all,

developed skills of concentration and focusing of attention. There was also a high level of agreement with the need to form information hygiene skills and rethink the role of the teacher as an organizer of thinking activities, and not just a source of knowledge.

A qualitative analysis of open-ended questions showed that the main factors that hinder concentration are constant notifications, information overload, lack of a clear study routine, and emotional fatigue. Among the conditions that promote concentration, respondents noted structured classes, clear tasks, limiting digital distractions, and lively intellectual interaction with the teacher. The responses also indicate a request for training in attention management skills and the conscious use of digital technologies.

Online learning creates ambivalent cognitive conditions: on the one hand, it expands the possibilities of individualization and self-regulation of educational activities, on the other hand, it increases the risks of information overload, cognitive fatigue, and a decrease in the quality of deep thinking (Table 1).

Table 1

Positive and negative aspects of cognitive conditions of online learning

Positive cognitive conditions	Negative cognitive conditions
Flexibility of learning pace, possibility of re-working the material	Increased cognitive load due to information overload
Access to a variety of digital resources and multimodal formats (video, visualizations, simulations)	Information noise and frequent digital distractions
Developing independent learning and self-regulation skills	Decreased ability to concentrate for long periods of time
Possibility of individualizing the learning trajectory	Predominance of superficial processing of information
Supporting asynchronous thinking and reflection	Cognitive fatigue due to prolonged screen time
Instant access to analysis, search and information processing tools	Working memory overload due to multitasking
Formation of digital and information competence	Weakening of deep critical thinking
The ability to use artificial intelligence tools to support learning	The risk of cognitive dependence on digital tools
Increasing student autonomy in making educational decisions	Decreased intrinsic learning motivation
Supporting different learning styles	Limited opportunities for social cognitive learning

It should be noted that personal transformations are not limited to purely professional competencies, but include deep cognitive and psychological changes that arise in response to external challenges of the educational and professional environment (Tverdokhliebova, 2025; Kostikova et al., 2023).

The obtained survey results confirm the presence of a transformation of the cognitive conditions of higher education students' learning in the online environment, which is manifested in a decrease in the stability of attention concentration, an increase in the

influence of information noise, and the ambivalent role of digital technologies and artificial intelligence. This highlights the need to review approaches to organizing the educational process, reorienting the educational process to the development of cognitive self-regulation skills, information hygiene, and conscious thinking.

Based on the analysis of the questionnaire, the following recommendations were formulated.

First, it is advisable *structuring of educational material* taking into account the limited duration of students' attention span. Online training sessions should provide for a clear logic of presentation, division of the material into meaningfully completed blocks, and alternation of informational load with pauses for reflection and comprehension.

Secondly, an important direction is *developing cognitive self-regulation skills*. The educational process should include elements of teaching students how to manage their own attention, plan learning activities, reduce multitasking, and use digital resources consciously.

Third, the survey results highlight the need *implementation of information hygiene principles*. It is advisable to limit the excessive amount of parallel digital stimuli during classes, minimize irrelevant messages, and recommend that students create a "low-noise" learning environment.

Fourth, the use of artificial intelligence tools in education should be *pedagogically regulated*. AI should be used as an auxiliary tool for explanation, examples, and feedback, without replacing the analytical and thinking activities of the teacher and student.

Fifth, taking into account the changing role of the teacher, it is effective to *orientation towards organizing students' thinking*, rather than just transferring knowledge. This involves the use of problem-based tasks, open-ended questions, reflective exercises, and discussions aimed at deepening understanding of the learning material.

Thus, reorienting online learning towards developing concentration, conscious thinking, and cognitive resilience of learners is a key condition for increasing its effectiveness in the modern digital educational environment.

DISCUSSION

In the modern educational discourse, the issue of the transformation of pedagogical activity under the influence of digital technologies and artificial intelligence is actively discussed. We agree with the opinion of Broadbent and Lodge (2021) that the online environment is not only a technical platform, it is a new cognitive ecosystem that changes the nature of attention, control of thinking and learning behavior of students. It is recommended to integrate elements of metacognitive learning into training courses, in particular, setting learning goals, reflecting on completed tasks, and self-assessment of cognitive activity. It is important to introduce tasks that involve planning intellectual activity, step-by-step completion of complex tasks, and conscious analysis of mistakes. This approach promotes the transition from impulsive information consumption to guided thinking.

Given the increasing information noise, it is advisable to include in educational programs separate modules or practical classes aimed at developing information hygiene skills. This involves teaching students to consciously limit digital distractions, critically select information sources, manage messages and digital notifications. It is recommended to form a culture of intellectual work during educational classes, in particular by regulating the use of digital devices and creating conditions for focused intellectual activity.

Educational tasks should be designed to require students to interpret, critically evaluate the results obtained using digital tools, and form their own conclusions.

To develop conscious thinking, it is advisable to systematically introduce reflective practices, including short analytical discussions, written reflections, and self-analysis of learning experiences. Such practices contribute to the formation of students' ability to be aware of their own cognitive processes, emotional reactions, and learning strategies. Particular attention should be paid to creating a psychologically safe educational environment that supports concentration, intellectual activity, and a responsible attitude to learning.

CONCLUSIONS

Thus, the development of digital technologies does not eliminate the role of the teacher, but changes the emphasis of his professional activity. From a translator of knowledge, the teacher moves to the role of a moderator of the educational process, a mentor and facilitator of cognitive activity, which is especially relevant in the context of the formation of social and emotional intelligence of students.

Reorienting the educational process towards the development of cognitive self-regulation, information hygiene, and conscious thinking involves comprehensive changes in the content, methods, and organization of learning that meet the challenges of the digitalized educational environment and contribute to the formation of sustainable cognitive and professional competencies of higher education students.

CONFLICT OF INTEREST

The authors declare that there are no conflicts of interest regarding the publication of this paper.

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No artificial intelligence tools were used in the preparation of this manuscript.

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ENSURING EDUCATIONAL CONTINUITY UNDER ARMED CONFLICT: THE UNDERGROUND UNIVERSITY MODEL IN UKRAINE

ЗАБЕЗПЕЧЕННЯ БЕЗПЕРЕРВНОСТІ ОСВІТИ В УМОВАХ ЗБРОЙНОГО
КОНФЛІКТУ: МОДЕЛЬ ПІДЗЕМНОГО УНІВЕРСИТЕТУ В УКРАЇНІ

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ABSTRACT

Russia's prolonged full-scale war against Ukraine has triggered profound social and humanitarian crises, including the systematic degradation of the educational environment, which directly threatens the intellectual development and future prospects of Ukraine's youth and makes timely, adaptive educational interventions critically necessary.

The purpose of this research is to investigate how Ukrainian higher education institutions, specifically Yaroslav Mudryi National Law University, are adapting to the exigencies of ongoing armed conflict through the implementation of underground, shelter-based educational practices.

Methodology. In order to examine the transformation of educational practices under conditions of armed conflict this research employed a mixed-methods case study, combining the empirical basis (for investigating the emergence of the "Underground University"), descriptive statistical methods (to identify trends in student participation and preferences across different modes of instruction) and qualitative thematic analysis (to identify recurring themes related to safety, accessibility, educational continuity, psycho-emotional well-being, and student engagement).

Results. Over three years of full-scale war, Ukrainian higher education institutions have developed adaptive educational models shaped by regional security conditions. Instructional formats range

Тривала повномасштабна війна Росії проти України спричинила глибокі соціальні та гуманітарні кризи, включаючи систематичну деградацію освітнього середовища, що безпосередньо загрожує інтелектуальному розвитку та майбутнім перспективам української молоді та робить своєчасні адаптивні освітні втручання критично необхідними.

Метою цього дослідження є вивчення того, як українські заклади вищої освіти, зокрема Національний юридичний університет імені Ярослава Мудрого, адаптуються до вимог триваючого збройного конфлікту шляхом реорганізації підвальних приміщень на бомбосховища, де впроваджуються освітні практики.

Методи. Для вивчення трансформації освітніх практик в умовах збройного конфлікту в цьому дослідженні було використано тематичне дослідження зі змішаними методами, що поєднує емпіричну основу (для дослідження виникнення «Підземного університету»), описові статистичні методи (для виявлення тенденцій участі студентів у різних форматах навчання та їхніх уподобань) та якісний тематичний аналіз (для виявлення повторюваних тем, пов'язаних з безпекою, доступністю, безперервністю освіти, психоемоційним благополуччям та залученням студентів).

Результати. Протягом трьох років повномасштабної війни українські заклади вищої освіти розробили адаптивні освітні моделі, сформовані відповідно до регіональних умов безпеки. Формати навчання варіюються від повністю дистанційного навчання поблизу

from fully distance learning near active hostilities to blended and on-site delivery in safer areas. At Yaroslav Mudryi National Law University, underground facilities were converted into fully equipped bomb-shelter classrooms to ensure continuity and safety. Student choice data reveal fluctuating preferences between distance and blended learning, followed by renewed demand for on-site instruction. This shelter-based approach sustained educational quality, engagement, and psychological well-being under ongoing armed conflict.

Conclusions. This study demonstrates that the Underground University model enables higher education institutions to sustain academic continuity, safety, and quality under armed conflict. By integrating underground learning spaces with blended pedagogies and experiential practices, Ukrainian universities foster resilience, psychological stability, and meaningful educational engagement, offering a sustainable model for higher education in crisis contexts.

Keywords: blended learning, model for higher education, university, Ukraine, war.

активних бойових дій до змішаного та очного навчання в безпечніших районах. У Національному юридичному університеті імені Ярослава Мудрого підземні приміщення були переобладнані на повністю обладнані аудиторії-бомбосховища для забезпечення безперервності навчання та безпеки. Дані про вибір студентів свідчать про коливання уподобань між дистанційним та змішаним навчанням, а потім про відновлення попиту на очне навчання. Цей підхід, заснований на використанні укриттів, забезпечив збереження якості освіти, залученості учасників освітнього процесу та психологічного благополуччя в умовах триваючого збройного конфлікту.

Висновки. Це дослідження демонструє, що модель «Підземного університету» дозволяє вищим навчальним закладам підтримувати академічну безперервність, безпеку та якість в умовах збройного конфлікту. Інтегруючи підземні навчальні простори зі змішаними педагогічними методами та емпіричними практиками, українські університети сприяють стійкості, психологічній стабільності та змістовній освітній залученості, пропонуючи сталу модель вищої освіти в кризових умовах.

Ключові слова: змішане навчання, модель вищої освіти, університет, Україна, війна.

INTRODUCTION

Russia's prolonged and full-scale war against Ukraine has precipitated a cascade of profound social and humanitarian crises. The deliberate targeting of educational institutions within conflict zones (spaces historically recognized as centres of intellectual, cultural, and civic development) has resulted in widespread infrastructural destruction and the near-complete disruption of conventional pedagogical practices. The systematic degradation of the educational environment poses a direct threat to the intellectual development and future prospects of Ukraine's youth, rendering timely and adaptive educational interventions critically necessary.

The extensive destruction of educational infrastructure (Figure 1), together with the forced displacement of students and academic staff, has generated an acute educational emergency. Beyond material losses, the psychological consequences of sustained warfare have significantly undermined learners' cognitive engagement, emotional stability, and capacity for sustained academic work.

These conditions necessitate a comprehensive and integrated approach to education that simultaneously addresses academic continuity and psycho-emotional well-being. In response to these challenges, Kharkiv that formerly was one of Ukraine's major academic centres has emerged as a testing ground for innovative educational practices aimed at preserving learning under extreme conditions.

Figure 1

H. S. Skovoroda Kharkiv National Pedagogical University after Russian attack (07.2022)



Note. Authors' own resource.

The persistence of armed hostilities has compelled a fundamental reconfiguration of educational delivery, requiring the adoption of pedagogical models capable of functioning within the severe constraints of wartime reality. Traditional forms of face-to-face instruction have become largely untenable in areas exposed to regular shelling, necessitating the exploration of alternative learning modalities that reconcile instructional quality with safety imperatives.

Within this context, the protection of students' and educators' physical safety and psychological well-being has become the primary organizing principle of educational policy and practice. This imperative has catalysed the development of non-standard solutions, including the creation of underground learning environments within bomb shelters (Kostikova et al., 2025) and the implementation of blended and hybrid instructional formats. Accordingly, the adaptive restructuring of higher education systems under conditions of persistent threat is not merely a temporary measure but a prerequisite for institutional survival and educational continuity.

Against this backdrop of unprecedented disruption, the present study addresses a central and urgent research question: How can the fundamental requirements of participant safety, psycho-emotional well-being, and high-quality educational provision be effectively integrated and sustained in conditions of protracted armed conflict? This question extends beyond theoretical inquiry, representing a practical and ethical challenge directly linked to the preservation of a nation's intellectual capital.

To address this issue, the article presents a detailed case-based analysis of the experience of Yaroslav Mudryi National Law University (Kharkiv), focusing on its innovative adaptation of teaching and learning processes within bomb-shelter environments. These cases provide empirical insight into the practical realization of the

right to education under conditions of elevated risk, enabling an examination of how institutional, pedagogical, and psychological dimensions interact in crisis-responsive educational models. Specifically, the analysis considers organizational and logistical arrangements, instructional strategies, and psycho-emotional support mechanisms that underpin these adaptive practices.

By critically examining these pioneering responses, the study contributes to a deeper understanding of how higher education institutions can sustain academic continuity, student engagement, and institutional integrity under conditions of armed conflict. Ultimately, this research documents and analyses the adaptive capacity and resilience of the Ukrainian higher education system, offering analytically grounded insights that may inform educational policy and practice in other regions confronting comparable crisis conditions.

The full-scale war in Ukraine has foregrounded the urgent necessity to critically reassess and adapt educational practices under conditions of armed conflict. Accordingly, this literature review synthesizes key scholarly contributions addressing education in crisis contexts, with particular emphasis on the challenges, transformations, and adaptive strategies necessitated by prolonged warfare. The review situates the Ukrainian experience within broader historical, sociological, and institutional perspectives on education in conflict-affected environments.

An examination of the historical dimensions of education in contexts of conflict provides an essential analytical foundation for the present study. Burton (2020) offers a historically grounded analysis of African students' pursuit of higher education under colonial rule, demonstrating how systemic violence, displacement, and the denial of educational access fostered alternative and often precarious pathways to knowledge acquisition. This historical perspective establishes a conceptual framework for understanding educational resilience, which is particularly instructive for analysing the endurance and adaptive capacity of Ukrainian higher education under contemporary wartime conditions.

In recent years, a rapidly expanding body of scholarship has emerged in direct response to the Ukrainian context. Within this growing corpus, several studies focus on the immediate and medium-term challenges of sustaining educational processes during wartime. Marchenko (2023), Fiialka and Kornieva (2024), and Zhyhora et al. (2024) document the systemic disruption of education following the onset of hostilities and the subsequent institutional shift toward emergency and digitally mediated learning formats.

Specifically, Marchenko (2023) analyses the initial collapse and rapid reconfiguration of university operations, emphasizing the imperative of preserving institutional structure, academic staff, and scientific potential. Fiialka and Kornieva (2024) underscore the importance of safety training, ethical responsibility, and the cultivation of psychological resilience among students. Zhyhora et al. (2024), in turn, examine the deployment of technological solutions, including video conferencing tools, mobile applications, and learning management systems, as mechanisms for ensuring instructional continuity. Collectively, these studies highlight the immediacy and pragmatism of the adaptive responses implemented by Ukrainian educators and students.

Complementing these institution-focused analyses, Torlone and Ishchenko (2024) investigate students' autonomous learning strategies during wartime, emphasizing the role of peer support networks and informal learning communities. While their work

primarily addresses individual-level learning processes, it implicitly reinforces the significance of institutional frameworks in facilitating self-directed learning, social cohesion, and psychological endurance under crisis conditions.

Beyond conceptual and sociological approaches, recent empirical research provides detailed insight into the operational functioning of Ukrainian universities under direct wartime pressure. Bugrov et al. (2023) present a case study of Taras Shevchenko National University of Kyiv as an institution operating in immediate proximity to active hostilities, documenting administrative restructuring, psychological support mechanisms, and infrastructural adaptations designed to sustain educational activities.

Similarly, Greshta et al. (2023) identify core systemic challenges confronting higher education institutions during the war, including staff displacement, infrastructural destruction, and disruptions to governance. Importantly, these authors propose institutional-level responses and policy-relevant solutions applicable to the national higher education system.

Further contributions address the experiences of universities affected by forced relocation and displacement. Orzhel et al. (2023) analyse development models for displaced Ukrainian universities, focusing on strategies that support institutional continuity and long-term recovery. Broader analytical overviews by Ugryn et al. (2023) and Tsybuliak et al. (2023) document a spectrum of adaptive practices, including trauma-informed pedagogy, temporary relocation, crisis governance, and risk management. Zayachuk (2025) draws attention to the war-induced challenges facing quality assurance mechanisms in higher education. Taken together, these studies demonstrate that, despite unprecedented constraints, Ukrainian universities continue to fulfil their core educational missions during wartime.

Nevertheless, a critical synthesis of the existing literature reveals a significant analytical gap. While current research extensively addresses digitalization, institutional resilience, psychological support, and emergency governance, it does not specifically examine the pedagogical, organizational, and psycho-emotional dimensions of teaching and learning conducted within bomb shelters as dedicated educational spaces. This lacuna underscores the originality and relevance of the present study.

Accordingly, the **purpose** of this research is to investigate how Ukrainian higher education institutions, specifically Yaroslav Mudryi National Law University, are adapting to the exigencies of ongoing armed conflict through the implementation of underground, shelter-based educational practices. By focusing on this emergent and underexplored educational format, the study contributes novel empirical and analytical insights into crisis-responsive higher education in conflict settings.

METHODOLOGY

This study employed a mixed-methods case study design to examine the transformation of educational practices under conditions of armed conflict. The case of Yaroslav Mudryi National Law University was selected as a representative example of a Ukrainian higher education institution adapting to prolonged wartime constraints through the implementation of underground and blended learning environments. The case study approach enabled an in-depth analysis of institutional responses, student preferences, and pedagogical practices within a real-life context of high uncertainty and risk.

The research was conducted during the ongoing full-scale war in Ukraine, when higher education institutions were forced to operate under constant security threats, including air raids and infrastructure damage. In response, Yaroslav Mudryi National Law University reorganised parts of its physical infrastructure by converting certified bomb shelters into equipped classrooms and simultaneously expanded online and blended learning formats. These conditions formed the empirical basis for investigating the emergence of the “Underground University” as a new educational practice in conflict settings.

Data were collected using multiple complementary sources to ensure methodological triangulation. These included: 1) institutional documents and internal reports related to the organisation of the educational process during wartime; 2) aggregated statistical data on student participation and preferences for online, blended, and on-site learning formats across consecutive academic years; 3) observations of teaching and learning practices conducted in underground classrooms and hybrid environments; 4) analytical review of relevant national and international scholarly literature addressing higher education in crisis and conflict contexts. All data were analysed in anonymised and aggregated form, ensuring ethical compliance and the protection of participants.

The analysis combined descriptive statistical methods and qualitative thematic analysis. Quantitative data were used to identify trends in student participation and preferences across different modes of instruction. Qualitative data were analysed inductively to identify recurring themes related to safety, accessibility, educational continuity, psycho-emotional well-being, and student engagement. Comparative analysis was applied to contextualise the findings within existing research on wartime education, distance learning, and institutional resilience. This allowed the identification of both shared challenges and distinctive features of the Underground University model.

The study adhered to established ethical standards for educational research conducted in emergency contexts. No personal or sensitive data were collected. Participation in surveys and observations was voluntary, and all findings are reported at an institutional level. Given the security situation, particular attention was paid to avoiding the disclosure of information that could pose risks to students, staff, or facilities.

While the case study design allows for in-depth analysis, the findings are context-specific and may not be directly generalisable to all higher education systems affected by conflict. Nevertheless, the study offers analytical generalisation by identifying practices and principles that may be transferable to other institutions operating under similar conditions.

RESULTS

Over a period exceeding three years, the Ukrainian educational community has been engaged in a complex, iterative process of identifying, testing, and implementing pedagogical solutions capable of functioning under conditions of full-scale war. Within this national context of crisis and resistance, significant regional disparities have emerged in the organization and delivery of higher education, primarily determined by geographical proximity to zones of active military hostilities.

Ukraine's vast territorial expanse (603,628 square kilometres) renders these disparities particularly pronounced, as approximately 20% of the country's eastern and southern regions remain under temporary occupation and subject to continuous military

confrontation. These conditions have compelled higher education institutions to adopt highly adaptive and context-sensitive educational strategies.

Higher education institutions located in occupied or frontline regions were forced to relocate to comparatively safer western areas of the country, where instruction could be resumed either in conventional classroom environments or through blended learning formats. In contrast, universities situated in close proximity to active hostilities transitioned entirely to distance learning modalities, prioritizing the physical safety of students and academic staff. While this shift was essential, it simultaneously introduced challenges related to educational quality, student engagement, and the preservation of academic community.

In August 2022, the State Service for Quality of Education in Ukraine conducted a large-scale anonymous online survey targeting educators, researchers, and students across higher education and vocational institutions. The survey aimed to assess the readiness of educational stakeholders for various instructional delivery formats during the 2022/23 academic year. With approximately 24,000 respondents, the survey provides statistically robust and representative insights into national educational trends, with results officially disseminated through governmental channels.

Among respondents affiliated with higher education institutions (69.4% of the total sample), a substantial proportion expressed readiness to resume face-to-face instruction. Approximately 10% reported that their institutions planned to initiate the academic year in a fully classroom-based format. However, the predominant institutional response involved the adoption of blended learning models, combining alternating periods of on-site and distance instruction (Husztí et al., 2024). This approach reflects an attempt to reconcile safety imperatives with pedagogical effectiveness.

Despite the recognized advantages of distance learning for ensuring safety, both students and academic staff consistently expressed a preference for in-person educational interaction, citing its role in maintaining academic stability, instructional quality, and meaningful engagement. Consequently, municipal authorities and university administrations in Kharkiv began actively exploring safe modalities for resuming on-site education. It is also widely acknowledged that online education is often perceived as less effective than traditional classroom-based instruction, particularly in disciplines requiring active interaction and applied learning.

As a result, during the summer of 2023, several higher education institutions in Kharkiv (located approximately 200 km from active combat zones) initiated the transformation of extensive subterranean facilities into fully equipped bomb shelters with classroom functionality. This strategic preparation enabled institutions to offer students an option for on-site instruction during the 2023/24 academic year under enhanced safety conditions.

At Yaroslav Mudryi National Law University, which possesses large multi-level underground spaces, these facilities were comprehensively adapted into dual-purpose classrooms and bomb shelters, equipped with ventilation systems, sanitary facilities, potable water supplies, electrical generators, public address systems, fire alarms, and multiple emergency exits (Figures 2a and Figures 2b). This infrastructural transformation represents a tangible institutional response aimed at sustaining educational continuity while prioritizing safety.

Figure 2

Educational space of the underground university bomb shelter



(a) Bomb shelter for students



(b) Classroom in the bomb shelter

Note. Authors' own resource.

In addition, student dormitories at Yaroslav Mudryi National Law University were similarly equipped with bomb shelters (Figure 3), demonstrating a comprehensive approach to student welfare that extends beyond instructional spaces.

Figure 3

Sleeping facilities in a bomb shelter (authors' own resource)



Note. Authors' own resource

During the 2023/24 academic year, students were afforded the opportunity to select the educational format most compatible with their psychological comfort and individual circumstances. Consequently, 51% of first-year students opted for fully remote instruction, while 49% selected a blended learning format, combining online lectures with on-site seminars and practical classes (Holubnycha et al., 2024).

This organizational decision was shaped by several constraints and pedagogical considerations. First, underground facilities lack sufficient capacity to host large lecture halls. Second, while live lectures enhance engagement, on-site participation is pedagogically more critical for seminars and practical classes, where immediate feedback, visibility, interaction, and hands-on activities are essential. Accordingly, underground spaces were primarily reconstructed to accommodate seminar and practical classrooms.

Initially, subterranean classrooms were intended for temporary use during air raid alerts. However, the extremely short missile flight time from the Belgorod region (approximately 40 seconds) often results in explosions occurring before warning sirens are activated. Moreover, the high frequency of alerts in Kharkiv necessitated repeated relocations, often every double period, which proved pedagogically inefficient. These relocations resulted in instructional time loss, decreased student concentration, and emerging disciplinary challenges. Consequently, the university administration adopted a strategic decision to conduct all on-site educational activities exclusively within subterranean classrooms.

In the 2024/25 academic year, 53% of first-year students selected fully remote learning, while 47% opted for blended instruction, indicating persistent safety concerns and student displacement. However, in the 2025/26 academic year, this trend reversed: 54% of first-year students chose on-campus learning in bomb-shelter classrooms, while 46% continued online education. This shift likely reflects cumulative fatigue from prolonged wartime restrictions and a renewed desire for academic normalcy and social interaction.

For academic staff, this hybrid educational arrangement provided a unique opportunity to comparatively evaluate distance and on-site teaching modalities, yielding practical insights into pedagogical effectiveness under crisis conditions.

Currently, higher education in Kharkiv operates through a diversified educational ecosystem, encompassing on-site instruction in bomb-shelter classrooms and synchronous distance learning via platforms such as Zoom, with explicit attention to students' psychological well-being. Teaching practices integrate traditional pedagogical methods (printed texts, blackboard instruction, audiovisual materials) alongside innovative approaches, including gamified learning (Kostikova et al., 2019; Soloshenko-Zadniprovska, 2025; Zhang et al., 2025), interactive whiteboards, and mobile learning technologies (Holubnycha et al., 2022).

One of the most distinctive pedagogical innovations implemented during wartime is the systematic integration of educational excursions. Unlike conventional practices, these excursions constitute a mandatory and weekly component of the curriculum. Students regularly visit forensic laboratories, museums of Forensics, prosecutor's offices, courts, and executive institutions in Kharkiv and Kyiv, including the Supreme Court, the Constitutional Court, and the Verkhovna Rada of Ukraine and many others (Figures 4 and 5).

Figure 4*University Students' Educational Visit***(a)** Museum of Forensics**(b)** Visit at the Verkhovna Rada of Ukraine**Note.** Authors' own resource

Under wartime conditions, educational excursions demonstrate enhanced pedagogical value, fulfilling multiple interrelated functions:

- *Instructional function*: facilitating contextualized, experiential learning that strengthens comprehension, retention, and academic motivation;
- *Stabilizing function*: serving a compensatory and restorative role within disrupted learning environments;
- *Cognitive engagement function*: reducing cognitive fatigue through experiential variation;
- *Psychological well-being function*: mitigating anxiety, restoring a sense of continuity, and supporting emotional resilience;
- *Social connectedness function*: fostering peer interaction, group cohesion, collaborative skills, and civic and professional identity formation.

The integration of these multifaceted pedagogical strategies within underground educational spaces exemplifies a novel and resilient model of higher education practice in conflict settings, underscoring the adaptability, innovation, and commitment of Ukrainian educators to sustaining meaningful learning under extreme conditions.

DISCUSSION

This study examined how Ukrainian higher education institutions, using Yaroslav Mudryi National Law University as a focal case, are responding to the unprecedented challenges

posed by full-scale war, with particular attention to the emergence of the “Underground University” as a novel educational practice in conflict settings. The findings demonstrate a complex interplay of institutional resilience, pedagogical adaptation, and strategic innovation, underscoring a sustained commitment to educational continuity under conditions of persistent physical threat and psychological strain.

The results align with and extend existing scholarship on wartime higher education in Ukraine, particularly research addressing the limitations and risks associated with distance learning. Galynska and Bilous (2022) identify accessibility, effectiveness, and safety as central challenges of wartime online education.

Our findings corroborate these concerns, as evidenced by the continued preference of a substantial proportion of students for fully online learning despite the availability of on-site instruction. At the same time, this study advances the discussion by demonstrating how blended and underground learning formats function not merely as stopgap solutions, but as structurally integrated pedagogical models designed to reconcile safety, accessibility, and instructional quality. The adaptive strategies employed by Yaroslav Mudryi National Law University illustrate an institutional effort to uphold educational equity across diverse student circumstances, thereby reinforcing the concept of education as a protected social right even under conditions of armed conflict.

In a broader disciplinary context, Sokol and Melko (2022) emphasize the risks of student outflow and intellectual capital loss caused by prolonged reliance on distance education. The Underground University model can be interpreted as a counter-strategy to this trend, providing students with a tangible, physically grounded academic experience within Ukraine. By enabling safe in-person engagement, underground classrooms reinforce students’ attachment to national institutions and reduce the centrifugal pull of foreign educational systems. Furthermore, the university’s integration of digital technologies and innovative teaching methods resonates with calls for pedagogical modernization articulated in the literature on crisis education.

Zayachuk (2024) situates wartime higher education within a legal and institutional framework marked by infrastructural destruction and systemic risk. The transformation of bomb shelters into permanent learning environments directly addresses these structural vulnerabilities, offering a practical solution to the challenge of safeguarding both human life and educational infrastructure. The blended learning model adopted by Yaroslav Mudryi National Law University also reflects a broader national trend toward hybrid educational ecosystems, which Zayachuk identifies as essential for maintaining quality assurance during wartime. In this respect, the Underground University emerges as a concrete institutional embodiment of policy-level priorities related to safety, flexibility, and educational quality.

Lugovyi et al. (2023) emphasize that the Russian invasion has compounded pre-existing global challenges to higher education, including those stemming from globalization and the COVID-19 pandemic. The case examined in this study exemplifies how these overlapping crises have catalyzed radical pedagogical innovation. The use of subterranean classrooms represents a spatial reconfiguration of learning, while blended instruction addresses constraints on academic mobility and international exchange. These adaptations may be interpreted as acts of institutional resistance, preserving the university’s operational integrity and symbolic role within Ukrainian society despite attempts at systemic disruption.

Antoniuk (2023) highlights security, infrastructure preservation, and human capital retention as defining challenges shaping the post-war future of Ukrainian higher

education. The findings of this study directly respond to these concerns, demonstrating how infrastructural adaptation and digital integration can mitigate educational loss. The Underground University model illustrates a proactive rather than reactive approach, positioning wartime innovation as a foundation for post-conflict recovery rather than a temporary deviation from normative practice.

Finally, Sibruk et al. (2023) stress the pivotal role of educators in fostering adaptability, resilience, and critical thinking among students during armed conflict. The educational practices identified in this study, particularly in-person instruction within protected environments and structured educational excursions, create conditions conducive to the development of these competencies. The emphasis on social interaction, experiential learning, and psychological stability supports students' holistic development and enhances their preparedness for professional and civic engagement in post-war contexts.

In sum, the case of Yaroslav Mudryi National Law University demonstrates that the Underground University constitutes a qualitatively new educational practice in conflict environments rather than a mere emergency response. By integrating underground learning spaces, blended instructional models, and psychologically supportive pedagogical strategies, the university maintains educational continuity while simultaneously asserting cultural resilience and national self-determination. This model not only preserves the core functions of higher education under extreme conditions but also redefines the spatial, pedagogical, and ethical dimensions of university education in times of war, offering insights of relevance to other regions experiencing armed conflict.

CONCLUSIONS

Thus, this study has examined the emergence and implementation of the "Underground University" as a novel educational practice developed in response to the extreme conditions of armed conflict. Using the case of Yaroslav Mudryi National Law University, the research demonstrates how higher education institutions can sustain academic continuity, safeguard participants, and preserve educational quality under persistent security threats. The findings confirm that education during wartime is not merely a matter of survival but can serve as a space for institutional resilience, pedagogical innovation, and social stability.

The results show that the transformation of bomb shelters into fully equipped learning environments enables the safe resumption of on-site instruction while maintaining compliance with security requirements. When combined with blended and distance learning formats, this approach allows universities to address heterogeneous student needs, mitigate psychological stress, and ensure equitable access to education regardless of geographic location or personal circumstances. The observed shifts in student preferences over successive academic years further indicate that prolonged exposure to crisis conditions generates a renewed demand for physically present, socially meaningful educational experiences.

Importantly, the Underground University model extends beyond infrastructural adaptation. It represents a systemic reconfiguration of educational space, pedagogy, and institutional responsibility, integrating safety, flexibility, and psycho-emotional support into the core logic of teaching and learning. The incorporation of experiential practices, including regular educational excursions, reinforces cognitive engagement,

social connectedness, and professional identity formation, thereby compensating for the cognitive and emotional burdens imposed by war.

In a broader perspective, this study contributes to the growing body of literature on education in conflict settings by offering an empirically grounded and conceptually articulated model of wartime higher education. The findings suggest that underground and hybrid educational practices can serve not only as emergency measures but also as sustainable strategies with relevance for other regions affected by armed conflict or prolonged crises. Ultimately, the experience of Ukrainian universities demonstrates that higher education can remain a powerful instrument of resilience, cultural continuity, and national self-determination even under the most adverse conditions.

CONFLICT OF INTEREST

The authors declare that *Liudmyla Holubnychka* is a member of the journal's Editorial Board but was not involved in any aspect of the editorial or peer-review process for this manuscript, including the publication decision.

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A COLLABORATIVE APPROACH FOR THE DEVELOPMENT OF PROSOCIAL BEHAVIOUR FOR SUSTAINABLE LEARNING IN RURAL ECOLOGIES

СПІЛЬНИЙ ПІДХІД ДО РОЗВИТКУ ПРОСОЦІАЛЬНОЇ ПОВЕДІНКИ ДЛЯ СТАЛОГО НАВЧАННЯ В СІЛЬСЬКИХ УМОВАХ

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ABSTRACT

Purpose. Disruptive behaviour by learners in school is a longstanding global concern that adversely impacts not only teaching and learning, but the overall school culture. The situation is even worse in marginalised areas such as rural settings in developing countries. Research shows that it is more effective to foster prosocial behaviour than to punish disruptive learners. Our study aims to explore strategies to promote acceptable social behaviour amongst adolescent learners in a rural school in Zimbabwe in order to enhance sustainable learning. Sustainable learning refers to educational practices that contribute to an evolving, healthy learning ecosystem in which knowledge is co-created and shared in a community.

Methodology. The qualitative study was underpinned by the Ubuntu philosophy as the theoretical framework. To conduct this study, we followed principles of Critical Emancipatory Research paradigm and the participatory research design. Data were generated by means of discussions and reflections with learners, teachers, and parents and were thematically analysed.

Results. The findings show that collaboration among parents, teachers, learners, and school management promotes prosocial behaviour. Strategies to promote sustainable learning include engaging all stakeholders in clubs, tapping into learners' curiosity and promoting good relationships between learners, teachers, and parents.

Conclusions. We conclude that, while there is no 'silver bullet' to promote pro-social behaviour among learners in rural ecologies, it is more likely to occur when all stakeholders in school communities work together. Therefore, we argue that if teachers and parents work collaborative, they can reinforce learning positive behaviour and values which lead to improved understanding and learning retention.

Keywords: collaborative approach, disruptive behaviour, pro-social behaviour, rural ecologies, sustainable learning.

Мета. Деструктивна поведінка учнів у школі є давнішньою глобальною проблемою, яка негативно впливає не тільки на викладання та навчання, а й на загальну шкільну культуру. Ситуація ще гірша в маргіналізованих районах, таких як сільські місцевості в країнах, що розвиваються. Дослідження показують, що ефективніше сприяти просоціальній поведінці, ніж карати учнів, які порушують дисципліну. Наше дослідження має на меті дослідити стратегії сприяння прийнятній соціальній поведінці серед підлітків-учнів у сільській школі в Зімбабве з метою покращення сталого навчання. Стале навчання – це освітні практики, які сприяють розвитку здорової екосистеми навчання, в якій знання створюються спільно та поширюються громадою.

Методологія. Якісне дослідження базувалося на філософії Убунту як теоретичній основі. Для проведення цього дослідження ми дотримувалися принципів парадигми критичного емансипаторного дослідження та партисипативного дизайну дослідження. Дані були отримані за допомогою дискусій та бесід з учнями, вчителями та батьками, й проаналізовані нами за темами.

Результати. Результати показують, що співпраця між батьками, вчителями, учнями та адміністрацією школи сприяє просоціальній поведінці. Стратегії сприяння сталому навчанню включають залучення всіх зацікавлених сторін, використання цікавості учнів та створюють хороші відносини між учнями, вчителями та батьками.

Висновки. Ми дійшли висновку, що, хоча не існує «чарівної палички» для сприяння просоціальній поведінці учнів у сільській місцевості, формування такої поведінки більш імовірно, коли всі зацікавлені сторони в шкільних громадах працюють разом. Тому ми стверджуємо, що якщо вчителі та батьки працюють спільно, вони можуть посилити навчання позитивній поведінці та цінностям, що приведе до кращого розуміння та запам'ятовування навчального матеріалу.

Ключові слова: співпраця, деструктивна поведінка, просоціальна поведінка, сільська місцевість, стале навчання.

INTRODUCTION

Disruptive learner behaviour in schools is cause for concern not only in Zimbabwe, the site of this study, but worldwide. Jung and Schröder-Abé (2019) define prosocial

behaviour as any positive action that is conducted on one's own accord which has the potential to engage and benefit other individuals in the community. This implies that such behaviour has both short- and long-term benefits for learners and advances sustainable learning.

Sibanda and Mabhena (2017) describe disruptive behaviour amongst adolescent learners as behaviour that deviates from expected norms and disrupts the order and harmony of the school. It also impinges on the rights of other learners and teachers to enjoy a healthy, safe environment based on mutual respect.

Disruptive behaviour is thus of concern to teachers, parents, and other stakeholders in rural and urban settings (Chikwature et al., 2016; Nārhiā et al., 2017). Such behaviour is not limited to the classroom but includes conduct in the school environment that negatively impacts teaching and learning. Internationally, the ban on corporal punishment has resulted in an increase in different types of disruptive behaviour in schools (Nārhiā et al., 2017; Jung & Schröder-Abé, 2019; Van der Graaff et al., 2017).

Violent and aggressive behaviour seems to be on the rise in all social environments, with schools not exempt from this scourge (Wu et al., 2016; Jones et al., 2017). Sustainable learning is impossible in disruptive, discordant environments (Michelsen & Fischer, 2017; Lunga, 2020). It is against this background that this study aimed to enable teachers, parents, and learners in a rural setting to take collaborative action to reduce disruptive behaviour, not by punishing it, but by introducing activities and policies to encourage pro-social alternatives.

A drive to enhance pro-social behaviour should target all learners, not only those exhibiting unruly behaviour. Adolescent learners are in a difficult phase of development where they are trying to find their identity and often do so by challenging authority and accepted norms. Positive psychology (Mares, 2017) focuses on enhancing positive behaviour rather than punishing problematic conduct among learners. Thus, promoting prosocial behaviour can be viewed as an optimal strategy to reduce learner misbehaviour, while at the same time improving mental health and resilience (Jones et al., 2017; Spataro et al., 2020).

From this perspective, schools should embrace proactive ways of developing and sustaining constructive patterns of behaviour and interaction, rather than simply adopting measures to handle disruptive behaviour. Social-emotional learning (SEL) emphasises that individuals have the capability to learn and harness a set of social, emotional, and related skills, attitudes, behaviour, and values (Ramirez et al., 2021; Gregory & Fergus, 2017), which creates more equitable learning environments for all learners (Jones et al., 2017; Jagers et al., 2019; Jagers et al., 2018). This suggests that what the learner experiences in school lays the foundation for the development of a sense of identity and self-worth to foster pro-social behaviour.

Prosocial behaviour increases the likelihood of generating mutual benefits and synchronisation of interpersonal or social relationships that protect an individual's identity, creativity, and initiative in the community (Mares, 2017). It helps learners to direct their thoughts, feelings, and actions to empower them to make the most of current and future learning opportunities, ultimately enabling them to improve their quality of life; thus, the community also benefits (Van der Graaff et al., 2017). A conducive classroom climate improves learning as teachers are able to engage more with individual learners (Mares, 2017).

Moreover, prosocial behaviour among learners mitigates the negative emotional effects of stress among teachers (Wu et al., 2016; Gregory & Fergus, 2017). Mares (2017) and Hoffmann et al. (2021) suggest that prosocial behaviour enhances psychological well-being, social relationships, and even physical health. It is positively linked to improved learning outcomes because it builds good relationships amongst learners, teachers, parents and other stakeholders within the community (Jung and Schröder-Abé, 2019; Okereke, 2016), leading in turn to improved and supportive school climates (Hoffmann et al., 2021) and thus enhanced learner engagement and commitment to learning (Närhja et al., 2017). Chikwature, Oyedele and Ganyani (2016) and Mares (2017) observe that social support positively impacts human well-being as it reduces the risk of loneliness, use of alcohol, and depression.

Okereke (2016) highlights that teamwork is crucial in addressing unruly behaviour among learners as it creates strong partnerships among community members. Based on this understanding, this study argues for a collaborative approach to promote prosocial behaviour in rural schools and beyond. The following question therefore guided our research: “What strategies do teachers, learners and parents believe can promote prosocial behaviour to enhance sustainable learning in rural ecologies?” We begin by outlining Ubuntu as our theoretical framework. Thereafter we explain the methodology employed, followed by discussion of the findings.

The Ubuntu philosophy as a framework to promote prosocial behaviour

This study was framed by the Ubuntu philosophy that Metz (2007) and Metz and Gaie (2010) describe as a moral theory linked to humaneness, sharing, charitableness, and cooperation. It thus promotes a spirit of participatory humanism. Hutton (2011) and Metz and Gaie (2010) identify five values promoted by Ubuntu, namely, (i) survival; (ii) compassion; (iii) solidarity; (iv) respect; and (v) dignity. The absence of these values may compromise the promotion of prosocial behaviour.

These values were used in this study to enhance social interconnectedness and collaboration among all stakeholders to encourage to promote prosocial behaviour and ultimately enhance sustainable learning. This is in line with Mugumbate and Nyanguru (2015) and Mangena (2012) who suggest that African people’s success is enhanced by caring communities, rather than individual self-reliance. This section details how the social values from the Ubuntu theory could be used to promote prosocial behaviour and enhance sustainable learning.

In order to integrate the values of Ubuntu, it is important to understand social behaviour in context. Social behaviour refers to people’s activities that influence or are influenced by members of the same community (Sevillano & Olivos, 2019). It ranges from conduct that brings individuals together to anti-social behaviour that divides communities. Ubuntu has a strong connective influence and regards responsibility for community welfare is a collective endeavour.

Two pathways can be followed to promote prosocial behaviour, namely, an interactive and self-sufficient one (Spataro et al., 2020). An interactive pathway aims to achieve interpersonal accountability which is possible in small rural communities where people live in close proximity to their neighbours. It stresses people’s interconnectedness in sharing one another’s struggles and solving one another’s problems. Spataro, Calabrò and Longobardil (2020) explain that understanding a culture calls for shared meanings (cultural interpretations) and shared activities (cultural practices). The people in most rural Zimbabwean communities share a common cultural ontology.

These beliefs are passed on to children by adults in the community and include norms such as being obedient, carrying out older people's instructions, helping the poor and needy, and working for the family in order for it and the community to thrive (Jones et al., 2017; Jagers et al., 2019). This is congruent with the proverb embedded in the Ubuntu philosophy: 'it takes a village to raise a child' (Mugumbate & Chereni, 2019); that is, all adults in the community have the responsibility to teach appropriate social values to children.

Two types of strategies fall under the interactive pathway, namely, anticipatory and transferral strategies. Anticipatory strategies are designed to enable teachers, parents and other stakeholders to implement measures that prevent disruptive behaviour and create a strong routine to reduce frustration (Armstrong, 2018). Thus, in order to promote prosocial behaviour, people within rural ecologies should have good working relations and collaborate for easy implementation of anticipatory strategies. Such strategies are regarded as the foundation for behaviour that enhances sustainable learning (Hoffmann et al., 2021; Laghi et al., 2018).

Examples include adopting a respectful, calm tone, and acting in a composed manner (Jung & Schröder-Abé, 2019). Hoffmann et al. (2021) stress that lesson topics should be relevant to learners' needs and context in order to avoid frustration and increase their concentration. Teaching strategies should be in harmony with learning styles and activities should be pleasurable.

It is important that teachers offer learners sufficient assistance so that they focus on working towards their own success rather than disrupting teaching and learning activities, as opposed to micromanagement which breeds needy, demanding, dependent learners (Armstrong, 2018; Ramirez et al., 2021). The quality of the teacher-learner relationship is also a key factor in promoting good behaviour and sustainable learning (Laghi et al., 2018; Jung & Schröder-Abé, 2019).

Närhia, Kiiskic and Savolainen (2017) note that transferral strategies engage learners in activities that enable them to concentrate on the expected behaviour. Teachers need to be aware of behaviour which signals that learners are becoming bored or disengaged and calmly implement sanctions to prevent disruptive behaviour (Armstrong, 2018). For example, peer learning can be used as a transferral strategy to enable learners to understand the importance of prosocial behaviour and encourage collaboration and teamwork. Stigmar (2016) and Carvalho and Santos (2021) note that sharing knowledge enables learners to become self-motivated and develop skills.

Good behaviour should be remarked on and celebrated (Närhia et al., 2017). Another transferral strategy entails setting tasks that must be completed immediately without any discussion (Jones et al., 2017). This allows learners to move step by step towards redirecting their unruly behaviour to one which is more socially acceptable at both school and in their community.

It enables all stakeholders to be more responsible, thereby enhancing sustainable learning. Self-sufficient pathways focus on learners' survival regardless of existing challenges (McClune, 2018). Allowing them to choose how they should behave and what they want to do is an effective and commonly used strategy to promote prosocial behaviour and increase participation in activities (Gregory & Fergus, 2017; Armstrong, 2018; Ramirez et al., 2021).

This pathway is not common in rural learning ecologies. However, Van der Graaff et al. (2017) and Jagers Rivas-Drake and Borowski (2018) recommend that learners be given opportunities to make their own decisions, as this helps them to understand the

consequences of their behaviour. An Ubuntu approach positively impacts rural communities because school stakeholders' cooperation empowers, emancipates, and transforms learners to become active participants in the learning process.

Our study **aims** to explore strategies to promote acceptable social behaviour amongst adolescent learners in a rural school in Zimbabwe in order to enhance sustainable learning. We now turn to the methodological aspects of the study.

METHODOLOGY

Our methodological choices were influenced by the critical emancipatory research (CER) paradigm. Thus, a qualitative approach was adopted that enabled parents, community members and learners to collaborate to think critically about ways of fostering and promoting prosocial behaviour in rural schools. The participants themselves generated strategies that they felt would develop prosocial behaviour and enhance sustainable learning in rural ecologies.

One secondary school was chosen as the research site because the first author observed that, amongst the five secondary schools within the cluster, it had the highest number of children of school-going age who were not attending school. A high rate of disruptive behaviour was also observed among learners in this rural school. Moreover, this was the only fully day school in the area, as the other four have a combination of boarding and day facilities.

An increasing number of girls between the ages of 15 and 20 with children was noted within this community. Three teachers volunteered to participate in the study (two Form Three teachers and one who was the head of the disciplinary committee) as well as three learners (two females and one male) and three parents. Form Three is equivalent to Grade 10 in South Africa.

The table below presents the participants' biographical details.

Table 1

Participants' biographical details

Code	Gender	Age group	Ethnic group	Designation	Level of education
T1	M	25-35	Shona	Class teacher	B.Ed. student
T2	M	45+	Kalanga	Class teacher	Diploma in Education
T3	F	25-35	Ndebele	Senior teacher	M.Ed. student
P1	M	35-45	Ndebele	Parent	O-level
P2	F	45+	Ndebele	Parent	Form 2
P3	F	35-45	Kalanga	Parent	O-level
L1	F	15-20	Kalanga	Learner	Form 3
L2	F	15-20	Kalanga	Learner	Form 3
L3	M	15-20	Ndebele	Learner	Form 3

The three-member academic research team's biographical details are set out in Table 2 below.

Table 2*Academic research team's biographical details*

Codes	Gender	Age group	Ethnic group	Designation	Level of education
R	M	35-45	Shona	Researcher	PhD
RS	F	45+	Zulu	Research Supervisor	PhD
RS	F	45+	English	Research Supervisor	PhD

We met every four weeks to discuss how to address disruptive behaviour and promote prosocial behaviour amongst learners. Data were generated by means of group discussions which were recorded and transcribed, and parents, teachers and learners' written reflections. We were aware of the power relations at play among parents, teachers and learners, and the first meeting brought all the participants together to foster a trusting relationship.

The purpose of the study and the importance of prosocial behaviour were also discussed at this meeting. Thereafter, each group had three separate meetings, making a total of ten meetings. It was agreed that all the meetings would be held at the school to reduce travel costs, but at times which did not disrupt lessons.

The discussions were unstructured and revolved around the question, "*How can we promote prosocial behaviour among learners at our school and in the community to enhance sustainable learning?*". Each group meeting lasted 45 minutes. A final meeting was held where all the participants came together to discuss the themes that the first author drew from each group.

Thematic content analysis was used to analyse the qualitative data that was generated by the research participants (Clarke & Braun, 2017). We applied Clarke and Braun's (2017) six steps, namely, familiarising ourselves with the data, generating initial codes, searching for themes, reviewing themes, defining and naming themes and producing a report on the findings. Permission to conduct the study was obtained from the Ministry of Primary and Secondary Education in Zimbabwe and the Humanities and Social Science Research Ethics Committee (Approval number: HSS/1899/018D).

The researchers adhered to the Belmont principles of justice, respect for anonymity and confidentiality, voluntary participation and beneficence (Anabo et al., 2019). Trustworthiness was established by using methodological triangulation through recorded and transcribed discussions and written reflections that were produced by the participants at home (Heale & Forbes, 2013).

The findings, data, interpretation, and conclusions were shared with the participants to enable them to clarify their intentions, correct errors, and provide additional information (Moon et al., 2016).

RESULTS

The findings are presented in line with the themes that emerged and are substantiated with verbatim extracts (translated from isiNdebele to English). The codes used for participants are: P1-P3 for parents, L1-L3 for learners and T1-T3 for teachers. The themes explain how the participants understood the concept of prosocial behaviour and their ideas on how to promote it within rural school contexts.

Theme 1:**Pro-social behaviour in rural ecologies**

While the participants agreed on the need to promote prosocial behaviour among learners, they initially differed on whose responsibility it was. One parent suggested that parents' absence has a negative effect on learners' behaviour in rural schools:

I agree with the idea that the learners should be encouraged to behave in a good manner to enhance sustainable learning ... but with the style of life it is now the duty of the teachers to teach children to behave because parents are staying away ... children are staying alone. (P2)

Through active participation in the study, teachers, parents and learners learnt that promoting prosocial behaviour requires a collective effort:

P2: For us to be able to encourage our children to behave in a way that is beneficial to other learners and the whole community I realise that we ought to work together.

T3: You know I have learnt an important lesson from this project that success in raising a child is to assist each other as teachers, parents, children themselves and all the members in the community.

L2: I never wanted my parents to know what I do at school, but I feel that being part of this research came as an eye opener to us as learners because I personally have seen that teachers can better assist us if they have good work connections with the parents.

The teachers were also of the opinion that they needed the support of parents and community members:

... prosocial behaviour should be decisively encouraged to every learner regardless of their capabilities and background ...through use of clear rules that are enforced and parental collaboration. (T3)

We all, as teachers, parents, and leaders in the community, need to give special attention to methods that lead to good behaviour to help all learners achieve their educational goals. (T1)

A learner recounted how a lack of prosocial behaviour affected learning in class, and implied that learners needed to take responsibility for their behaviour:

It can be good if learners can behave well at school because it [disruptive behaviour] disturbs us a lot; some teachers end up not teaching because of the bad behaviour of our fellow learners. (L3)

The thinking of the parent who initially passed responsibility for learners' behaviour to teachers shifted during the meetings and she ended up supporting the idea of a collective duty:

What I can say is that 'igugu liyadonselanwa' [something special is scrambled for] so let us be united if we want to come to a solution to the problem of our children's behaviour... (P2)

Theme 2:**Changed behaviour among learners**

The teachers mooted activity clubs as one of the co-operative processes that can be used in schools to promote prosocial behaviour. An activity club is a union of people who work

together to accomplish an assigned task which helps to change a particular situation faced by a specific group of people.

... we can make use of activity clubs as a strategy to make sure that learners behave in a manner that is acceptable both at school and at home ... and this will help to enhance learning which is meaningful to learners ... hence they can use the knowledge in their entire life. We once had the 'junior call' where we could put children in groups and involve them in projects such as poultry, gardening, sewing and cookery, which could keep them busy...and it was helpful in encouraging some attributes like caring, and working together for the community...among the learners. (T3)

One of the parents supported this idea and added that engaging learners to join clubs will limit the time available for them to misbehave:

It is important that we have some clubs ... so that the learners do not get time to misbehave but work towards their own benefit as well as that of other learners and the community. (P2)

In addition, one teacher's notes in her reflective journal that:

...it is important that as teachers, we redirect the disruptive learners to other activities that are within their area strength. This will not allow the learner to have an opportunity to behave in a disruptive manner rather it can motivate him or her to learn ... (T3)

Theme 3:

Potential strategy to promote prosocial behaviour

Although it is vital that learners' curiosity is identified and respected if prosocial behaviour is to be promoted and sustainable learning is to be enhanced (Hoffmann et al., 2021), this is not a common teaching approach in rural ecologies. The parents and teachers' responses suggested that some believe that it is part of their culture for children to obey adults:

You know if as adults we can say what these children want must be considered then we are making them to disrespect us. Remember when we grew up, we used to know that a child must not interfere or argue with an adult, so I feel let us stick to our culture. We don't want our children to twist us left, right and centre. (P3)

However, we argue that holding onto traditional practices oppresses learners and denies them the right to be active participants in their learning. Some participants acknowledged the importance of focusing on learner interests:

As parents and teachers, it is important that we identify the curiosities of our children. This will help in making them like school and behave well. So maybe we should try to persuade them with what they like so that we can nurture the talent they have through working together with the teachers at school. (P1)

One teacher differed on the notion of identifying learner's curiosity, but appreciated the need to collaborate with other stakeholders in addressing this issue:

...it is dangerous to identify and consider the interest of the learner as teacher because some learners have very wild curiosities...we need to have a plan that can assist all learners, for example, working together with parents and other learners ... (T2)

Furthermore, learners made the following observations with regards to identifying their interests:

...we have our own ambitions, but the problem is that teachers just put us in classes without consulting us and that affects us ... (L2)

In my opinion if the teachers can put us in classes based on our curiosities it can be of great assistance in making learner behave well since they will be doing something they like. (L3)

Theme 4:

Creating a good relationship with learners

The participants suggested that good relationships amongst learners, teachers, and parents are key to the promotion of prosocial behaviour in schools. Therefore, teachers and parents should find a way of engaging with learners so that they understand one another. In responding to the question on whether good relationships can assist in promoting prosocial behaviour among learners, participants commented:

Befriending the child can also help to reduce the learner's disruptive behaviour ...by discussing issues which have nothing to do with education ...and addressing the problems faced by the learners. (P3)

Good teacher/parent-learner relations are very important because they ensure cooperation for resource mobilisation and ... help in motivation and curbing of indiscipline. (T1)

It will break down the 'them-against-us' attitudes from the three parties involved. Energy will be focused on one goal that is of teaching and educating the learner concerned. (T3)

and ...to a greater extent a good parent/teacher-learner relationship can encourage good behaviour as it expands participation of the learners in their learning activities. The learner will also have a sense of belonging to the system (T2)

While the parents and teachers agreed that good relationships are central in promoting prosocial behaviour, learners had different perceptions of this issue:

Having a good relationship with teachers may cause serious problems because some teachers display bad behaviour which is copied by the learners. (L2)

DISCUSSION

This section provides a discussion of the results in relation to themes presented in the previous section. Relevant literature is drawn on to support and compare the findings.

Theme 1:

Responsibility for promoting pro-social behaviour in rural ecologies

The findings suggest that the responsibility of ensuring that learners behave well to teachers since many parents are absent for various reasons and children are left at home alone or with relatives. Although scholars such as Armstrong (2018); Laghi et al. (2018) and Jung and Schröder-Abé (2019) support this notion, the principles of *Ubuntu* stress the importance of collaboration and interrelationships in the community to come up with lasting solutions to problems (Mugumbate & Chereni, 2019; Noel, 2016; Wood 2020).

This study aimed to bring about change in the way people think about prosocial behaviour and encourage such collaboration.

The *Ubuntu* theory emphasises collaboration to improve the lives of children and the community (Mugumbate & Chereni, 2019). The study's findings concur with the literature that suggests that responsibility for dealing with disruptive behaviour lies with teachers, learners and parents (Okereke, 2016; Lunga, 2020; Jung & Schröder-Abé, 2019). They also highlight that these stakeholders, as well as traditional and religious leaders, play an important role in this respect in rural communities (Chidakwa et al., 2024; Mangena & Chidakwa, 2024).

The reality in rural learning ecologies is that some teachers may abandon classes where learners are disruptive. Sibanda and Mabhena (2017) note that indiscipline has caused many children to be excluded from education in Zimbabwe. Abandoning classes violates the values of compassion and solidarity which are embedded in the *Ubuntu* theory. The problem of disruptive behaviour in schools requires all stakeholders to unite and to work collaboratively for the general good of both learners and the community to encourage sustainable learning in rural ecologies.

This view is supported by Armstrong (2018) and Mares (2017) who highlight that developing prosocial behaviour among learners is the collective responsibility of all community members. The African proverb that states, 'it takes a village to raise a child' (Mugumbate & Chereni, 2019) encompasses the five values of *Ubuntu* (survival; compassion; solidarity; respect; and dignity). Collaboration entails that people care about making a positive difference in other's lives through enhancing individual growth and effectiveness (Yada et al., 2020; Jäppinen & Ciussi, 2016).

The following themes present the participants' ideas on how prosocial behaviour can be fostered in rural learning ecologies.

Theme 2:

Activity clubs may promote changed behaviour among learners

The participants agreed that clubs can be useful in guiding learners to behave according to the school's code of conduct. Although obeying school rules is important, prosocial behaviour is much more than that; it aims to benefit other learners and the community in areas such as helping, sharing, donating, co-operating, and volunteering within the school system. In the classroom situation, prosocial behaviour has the potential to increase enthusiasm for learning and ensure that learners make positive contributions to the class and the broader social and emotional school climate (Mares, 2017; Wu et al., 2016).

The participants suggested that being part of clubs would prevent frustration and boredom and encourage learners to express their feelings in a constructive manner. This notion overlaps with the concept of social-emotional learning (SEL) (Jung & Schröder-Abé, 2019) which promotes the development of self-awareness, self-management, social awareness, relationship skills, and responsible decision-making amongst learners. Mutsvara (2021) notes that individuals with social-emotional skills can cope with challenges and progress academically, professionally, and socially. Social-emotional learning assists learners to develop positive self-esteem, manage their emotions, set and achieve goals, show empathy for others, and handle stress.

It is important to involve learners in activities that develop self-awareness, self-control, and interpersonal skills that are vital for school, work, and life success. *Transferral* can also promote prosocial behaviour (Armstrong, 2018; Jones et al., 2017). Through

involvement in activity clubs, learners are redirected from behaving in a disruptive manner to concentrating on learning and helping others to learn effectively. Närhia, Kiiskic and Savolainen (2017) and Van der Graaff et al. (2017) state that prosocial behaviour can be promoted by redirecting learners and celebrating their motivational and dynamic energy.

The reflections demonstrate teachers' understanding that occupying learners in certain tasks can assist in guiding them to behave in an acceptable manner in learning ecologies. It supports the use of peer groups where they can be guided to support one another in a positive manner. Such a strategy encourages learners' sense of collectiveness and promotes the distribution of knowledge within the community (Stigmar, 2016; Carvalho & Santos, 2021).

It can thus go a long way in reshaping learner behaviour which will enhance sustainable learning. Moreover, activity clubs are an anticipatory strategy that can be used to identify learners' needs and goals, which Armstrong (2018) and Laghi et al. (2018) identify as one of the duties of teachers. This enables teachers to help learners to develop in ways that lead to the achievement of their goals. The next theme details how tapping into learners' curiosity can be helpful in promoting prosocial behaviour.

Theme 3:

Tapping into learners' curiosity is a potential strategy to promote prosocial behaviour

The current situation where learners' interests are not considered in decision-making in schools indicates that parents and teachers regard learners as passive recipients of whatever is expected of them. This could negatively impact the development of prosocial behaviour. The literature supports using learners' curiosity as an anticipatory strategy to encourage them to participate in educational activities for the benefit of other learners (Gregory & Fergus, 2017; Ramirez et al., 2021; Armstrong, 2018).

However, it is important that learners receive proper guidance from both teachers and parents so that their interests benefit other people in the community. Parents and teachers should work together to identify learners' curiosity and find ways to engage them in activities that will also promote the social good.

We understood these sentiments to mean that learners felt that teachers' actions are the reason why they fail to fulfil their ambitions: '*... teachers just put us in classes without consulting us and that affects us ...*' This shows that they want to take responsibility for their education and build their own future. The current education system denies them this opportunity as it groups learners according to subjects and age. We argue that the system should be designed to encourage adults to guide learners to make sound decisions regarding their interests. Such involvement would not only assist them, but the community at large.

As the data was analysed by all the members of the group, participants had the opportunity to listen to the recordings, and read the transcriptions and reflections. The teachers seemed to value the parents and learners' opinions and felt that they should be put to good use. In the community where the study was conducted learners were dropping out of school, bullying other learners, disrespecting teachers, and parents, and were involved in sexual activities, to their own and others' detriment. Participating in the study proved to be a starting point in transforming learners, parents and teachers' thinking regarding collaboration to promote prosocial behaviour among all.

Theme 4:**Prosocial behaviour may be encouraged by creating a good relationship with learners**

Although parents and members of the public tend to assume that all teachers are of good character and instil a disposition and qualities that assist young people (Rubbi-Nunan, 2021) and make them useful members of society, the above remark suggests that teachers' behaviour is also cause for concern.

Rubbi-Nunan (2018) found that, while some South African teachers have the necessary qualifications to teach, their moral character disqualifies them because it takes more than an academic qualification to be a good teacher. It is thus important that teachers lead by example in portraying prosocial behaviour, as it then cascades to learners.

Nonetheless, the parents and teachers' views are in line with those of Laghi et al. (2018) and Jung and Schröder-Abé (2019) who state that prosocial behaviour can only be promoted in schools through good teacher-learner relationships.

The data suggest that all the participants accepted the need to change the way things are done in the school and the broader community. Hoffmann et al. (2021) suggest that effective promotion of prosocial behaviour requires teachers, parents and other stakeholders to take collective action. Good relationships can yield long-term support that enhances such behaviour which benefits learners, teachers, parents and the entire community.

CONCLUSIONS

This study explored the need for collaboration among all stakeholders to come up with contextually relevant strategies to promote prosocial behaviour to enhance sustainable learning in rural ecologies. We acknowledge that no prescriptive, single or common strategy can be utilised to accomplish such a goal.

The findings suggest the need to employ a collaborative approach where different stakeholders participate in identifying strategies which suit a specific setting and work best towards the development of prosocial behaviour.

Participation in this study led to changes in thinking as the participants listened to and learnt from one another. The strategies they selected included setting up activity clubs, tapping into learners' curiosity and creating a good relationship with learners. We conclude that proper implementation of these strategies could go a long way in enhancing sustainable learning.

Schools should thus create conducive environments which allow all stakeholders in the community to collaborate to find ways to promote prosocial behaviour that minimises disruptive behaviour and enhances sustainable learning.

CONFLICT OF INTERESTS

The authors declare that there are no conflicts of interest regarding the publication of this paper.

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SAFE LEARNING ENVIRONMENT AS A THEORETIC CONCEPT AND ITS PRACTICAL EMBODIMENT IN WARTIME UKRAINE

БЕЗПЕЧНЕ НАВЧАЛЬНЕ СЕРЕДОВИЩЕ ЯК ТЕОРЕТИЧНА КОНЦЕПЦІЯ ТА ЇЇ ПРАКТИЧНЕ ВТІЛЕННЯ В УКРАЇНІ ПІД ЧАС ВОЄННОГО ЧАСУ

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ABSTRACT

Purpose. This study aims to explore different approaches to conceptualize a safe learning environment and its components from physical, psychological, ecological, and informational perspectives. The goal is to investigate institutional strategies and policies vectored to safe learning environment creation and to examine measures taken by the

Мета. Це дослідження має на меті розглянути різні підходи до концептуалізації безпечного навчального середовища та його компонентів з фізичного, психологічного, екологічного та інформаційного погляду. Завданням є дослідження інституційних стратегій і політики, спрямованих на створення безпечного навчального середовища, а також вивчення заходів, вжитих керівництвом Сумського

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management of Sumy National Agrarian University (SNAU), Ukraine, to ensure the safety of students, academics and faculty amidst the martial law.

The **methodology** covers a comprehensive set of theoretical and empirical methods, including the analysis of scientific sources regarding the essence of safe learning environment, its peculiarities in a peaceful period and during the martial law; systematization of SNAU policies and documents in the field of SLE creation, interviews with students, faculty, academia and educational stakeholders. The study described institutional strategies and measurements which were taken in the period from autumn semester 2022 to autumn semester 2025.

Results. The research reveals theoretical aspects and practical approaches to the formation of a safe learning environment in compliance with the rights and norms of physical, psychological, informational, and ecological safety of participants in the educational process. The authors examined inputs, outputs and outcomes of different aspects of safe learning environment, and highlighted university policies and strategies regarding safe learning environment creation in Sumy National Agrarian University.

Conclusions. The conclusion is that creation of SLE in the period of martial law requires a comprehensive approach that will include the following key components: organization and maintenance of security (physical, environmental, psychological, information) of the entire educational infrastructure; ensuring equal access to educational resources, since the conditions of military conflict quite often lead to overlapping access to educational resources, especially for those regions that have suffered the most from Russian aggression; implementation of psychological support and effective psychological and pedagogical interaction.

Keywords: distance learning, educational process, martial law, safe learning environment, university policies and strategies.

національного аграрного університету (СНАУ), Україна, для забезпечення безпеки студентів, викладачів і персоналу університету під час воєнного стану.

Методологія охоплює комплексний набір теоретичних та емпіричних методів, включаючи аналіз наукових джерел щодо суті безпечного навчального середовища, його особливостей у мирний період та під час воєнного стану; систематизацію політики та документів СНАУ щодо створення безпечного навчального середовища, інтерв'ю зі студентами, викладачами, академічним персоналом і стейкхолдерами в освітній галузі. У дослідженні описано інституційні стратегії та заходи, які були проведені у період з осіннього семестру 2022 року по осінній семестр 2025 року.

Результати. У дослідженні розкрито теоретичні аспекти та практичні підходи до формування безпечного навчального середовища з дотриманням прав і норм фізичної, психологічної, інформаційної та екологічної безпеки учасників освітнього процесу. Автори розглянули вхідні, вихідні та кінцеві результати різних аспектів безпечного навчального середовища, а також висвітлили університетську політику та стратегії щодо створення безпечного навчального середовища в Сумському національному аграрному університеті, Україна.

Висновки полягає в тому, що створення безпечного навчального середовища в період воєнного стану вимагає комплексного підходу, який включає такі ключові компоненти: організація та безпека (фізична, екологічна, психологічна, інформаційна) всієї освітньої інфраструктури; забезпечення рівного доступу до освітніх ресурсів, оскільки умови воєнного конфлікту досить часто призводять до дублювання доступу до освітніх ресурсів, особливо для тих регіонів, які найбільше постраждали від російської агресії; упровадження психологічної підтримки та ефективної психолого-педагогічної взаємодії.

Ключові слова: дистанційне навчання, освітній процес, воєнний стан, безпечне навчальне середовище, університетська політика та стратегії.

INTRODUCTION

No doubt, safety of learning environment is critical for positive outcomes of every student and teacher. But in the conditions of a full-scale military invasion the problem of the safety of each participant in the educational process is getting vital. Apparently, nowadays the security component of the educational process is mainly associated with

real threats of the use of military force, missile strikes, shelling and bombing, etc. Nevertheless, educational institutions face various challenges and dangers that can affect the safety of participants in the educational process and the learning environment, including health threats, environmental problems, technological risks, cybersecurity, as well as social and psychological aspects, such as bullying, violence, etc.

The Law of Ukraine “On Complete General Secondary Education” (2020) states that an educational institution must create a safe educational environment in order to ensure proper and safe conditions for learning, upbringing, and development of students. The Concept of Safety of Educational Institutions for 2023-2025 (2023) states that administrations of educational institutions should take into account all aspects of caring for life and safety of people, who are involved in learning process.

This article is **aimed** to explore various approaches to conceptualize safe learning environment and its components from physical, psychological, ecological, and informational perspectives, as well as to examine activities taken by the university management for providing safety of students, academics and faculty during military conflict.

Objectives of the study included the study of scientific sources that regard safe learning environment as a pedagogical phenomenon and investigation of institutional strategies and policies vectored to safe learning environment creation, that had been applied in war period by the authorities of Sumy National Agrarian University (SNAU), their potential challenges and actual benefits, measured on the basis of official documents analysis.

METHODOLOGY

This study applies a mixed-methods approach that combines theoretical and empirical methods to address the objectives outlined. Numerous scientific sources were studied to point out approaches for conceptualization of safe learning environment (SLE) as a pedagogic phenomenon from different aspects, namely, its physical, psychological, informational, and ecological aspects. Recent researches in Ukraine and abroad were investigated to regard the essence of safe learning environment, its peculiarities in a peaceful period and during the martial law, culture of safety and its nationally dependent diversity, classroom management and educational policies.

On the other hand, empirical methods involve qualitative approaches such as interviews with students, faculty, academia and educational stakeholders. Sumy National Agrarian University (SNAU) is situated in the close proximity (about 30 kilometers) to the front line of military actions since 2022 (the beginning of a full-scale Russian invasion to Ukraine), nevertheless it didn't stop its educational process due to the complex of institutional strategies and measurements, taken by the university authorities and faculty. The described institutional strategies and measurements were taken in the period from autumn semester 2022 to autumn semester 2025.

The authors used analysis and systematization of the university policies and documents in the field of SLE creation. Measurement was performed toward the chosen indicators: inputs (strategies, policies and programs that are applied in SNAU); outputs (various activities carried out in safe learning environment agenda of the university); outcomes (SLE creation in the university through the interviews). A sample of 40 second-year undergraduate students – the participants of the Erasmus+ Jean Monet Module projects “EU strategies extrapolation for boosting students’ media literacy in Ukrainian HE” and “The linguistic dimension of the notion “security” as the key component of the concept of a safe educational space: the European experience, 20 representatives of academic

and faculty staff, the university administration, and 10 representatives of educational stakeholders, was determined for the survey. The participants voluntarily got involved in it. Through semi-structured interviews the respondents were encouraged to share their experiences, concerns, and recommendations regarding the creation of safe educational environment.

RESULTS

1. Safe Learning Environment as a scientific concept

Modern researchers have interpreted educational environment as a part of life-social space of a person, which is manifested in the totality of all institutional and pedagogical factors that directly or indirectly affect the personality in the processes of learning, upbringing and development (Fox, 2009; Gayle et al., 2013; Prashanti & Ramnarayan, 2020).

Although educational institutions are socially envisioned as secure spaces for young generations to learn and develop, there is growing anxiety about learning environments being subjected to violence, associated with delinquent activities of criminal gangs and bullying. Aggressive and deviant behavior among students were proved to be factors that negatively impact learning outcomes, cognitive abilities of students, school psychological climate, and attendance of classes (Azeredo et al., 2015; Elipe et al., 2015).

That is why a number approaches were applied to highlight the points, crucial for providing security of learning spaces. Among them, Fox (2009) conceptualized "safe learning environment" (SLE) in the context of tasks of faculty, essential safe educational environment creation in the campus of higher educational institution. Hunter (2008) identified the following components of a SLE: physical aspects as the characteristics of the space that protect the body from harm; psychological aspects that prohibit discriminatory actions, expressions of intolerance or policies of injustice; informational aspects that determine the degree of familiarity and comfort in the educational space; ecological aspects of space safety that eliminate risks on the part of participants in it. Kibriya and Jones (2021) suggested the technology for forming a SLE, which is based on the idea of organizational and activity planning; definite steps for constructing a physically and psychologically safe educational environment were proposed. The other scholars (Bačová, 2024) believed that the SLE should be created as a system of influences and conditions for the formation of personality in the social and spatial-subject environment.

Many scholars investigated safety of learning environments from various perspectives, e.g., Kempen, Labuschagne, and Jama (2024) analysed educational spaces from health and safety perspective. Bara (2022) studied violence in learning institutions and its long-term consequences. Alfano and Goerlach (2022) pointed out the negative impact of school violence victimization on social media. Hepburn, Beamish, and Alston-Knox (2021) regarded educational safety and classroom management from an organisational perspective, while Hardie et al. (2022) investigated it more from psychological and cultural angles. Moreover, views of scientists on the culture of secure education, the conception of opposition to violence (people should say "no" to violence and cruelty, bullying, on the other hand, constructing peaceful non-violent communication and mediation in education, teaching soft skills, psychological resilience and financial literacy (Opanasenko & Novikova, 2022).

Besides, as Domalewska et al. (2021) stated, a person's subjective view on safety is greatly impacted by the national culture along with educational institution values. They studied cultural background influence on learners' opinions about safety. Comparing opinions

and ideas of Polish and Vietnamese students on school safety, it was found out that organisational safety culture and atmosphere might differ significantly between these two cultures, as e.g. whereas Polish students highly evaluated such teachers' qualities as respectfulness, supportiveness, non-judgmental and encouraging attitude, Vietnamese students praised a more authoritarian behavior of a teacher, who could be able to support a safe space for learners.

Indeed, classroom management is one of the key points in SLE creating, however, in practice it is a complicated and challenging task. Australian Education Research Organisation (2023) reported about Australian teachers' claims on disrupted classrooms, problems with dealing with students who talked out of turn, interrupted teachers, used mobile phones inappropriately, did not concentrate in class, behaved rudely and provoked other students, avoided schoolwork, were late for class etc., thus effecting the learning process in a deteriorating way.

Concurrently, any educational culture insists on treating students with respect, giving equal opportunities for self-disclosure, allowing peer assistance, and not discriminating between them, ensuring the approachability of the teacher and willingness to listen to the student voices, cherishing diverse opinions and attending student needs in individual level (Hepburn et al., 2021). Nevertheless, Gillen et al. (2011) proved SLE that should not be interpreted as a problem- and conflict-free space, yet a conflict here means the diversity of views and attitudes, free circulation of ideas, potential disagreements that provoked critical thinking as natural components of the learning process.

In this aspect psychological safety was described as an important factor used to encourage learners' stepping outside their comfort zone and expressing themselves openly and honestly. If students are not academically challenged, they cannot make the expected progress, because they need to feel emotionally safe and be open to having their ideas critically evaluated by others in the classroom (Hardie et al., 2022).

The concept of physical security, as an object of investigation of many scientists, is often regarded as a set of measures aimed at avoiding dangers, minimizing risks for life and health, protection from injuries and wounds, ensuring safe conditions for all participants in the educational process, ensuring water supply, food and medical care. As all other SLE aspects, it is closely connected with the situation in the country in general. Until recently, physical security was considered only from the point of view of protection from man-made, natural and social influences, however, with the introduction of martial law on the territory of Ukraine, the protection of students from the consequences of military actions has become important. The organization of physical security in current conditions involves a set of measures aimed at minimizing the risks of injuries from firearms and artillery weapons, explosions and missile attacks (Lokshyna et al., 2022). The main goal of teachers' activities in the case of danger is to preserve the life and health of students.

Accordingly, the functioning of an educational institution should be based on the main aspects of physical security: premises, infrastructure and shelters, verification and systematic control over compliance with the requirements of building and sanitary norms and rules, as well as systems for preventing and protecting against dangerous situations; equipment of protective structures and relevant premises, organization of access to drinking water and food; evacuation plans, development of an algorithm of actions in case of dangerous situations, etc. (Kaidanovska & Dumnych, 2023).

Yet, in peaceful countries other points are more essential, e.g. Nichols and Monea (2022) investigated laying out of data-driven surveillance (i.e., dataveillance) technologies in

educational institutions, which are increasingly being used as a strategy to reduce security risks. The authors point out that the sense of safety that educational environments derive from these technologies often comes at the expense of the actual well-being and privacy of learners. They conclude with suggestions for how educators can reduce their reliance on data-tracking without compromising students' safety. In this point physical security correlates with Information and Communication Technologies implementation into the agenda of learning environments.

The most current approach to conceptualizing SLE is informational security. It is obviously important nowadays, as the use of information and communication technologies in the educational environment has a broad and powerful impact on the development of the individual. At the same time, there are certain negative aspects of the impact of information on the individual as a whole and the modern educational environment in particular: lack of proper mechanisms for controlling the quality of information that is available through telecommunication technologies.

This leads to the spread of a large amount of unreliable (false) information in the educational space; uncontrolled dissemination of information with aggressive content, which directly affects the spread of violence, bullying, cyberbullying and other negative social phenomena (Chen et al., 2026).

Ecological safety is a state that guarantees the prevention of deterioration of the ecological situation, the preservation of ecological balance and absence of threats to life, health and sustainable development of people in it, according representatives of the Copenhagen school (Buzan et al., 1998). The main components and principles of ecologically safe learning space, as well as the set of policies and measurements, performed by the institution's authorities, include health protection, prevention of danger to learners, academia and faculty, reduction of their possible chronic diseases due to pollution; environmental protection of campus, preservation of atmospheric air, water resources, soils, flora and fauna; technological safety by creation of environmentally safe technologies, purification from radionuclides, waste disposal, normative regulation.

Ecological security is also regarded as a basis of ecological consciousness in the structure of public consciousness. So, the other essential vector of faculty's activities is the formation of learners' ecological culture, as a set of various forms of activity in which ecological thinking is externally reflected. Eventually, every educational institution is responsible for establishing core values and promoting a deep understanding of environmental responsibility, understanding of nature, human resources potential and sustainable development of society (Cvetković et al., 2024).

Therefore, the analysis of scientific sources demonstrated theoretical aspects and practical approaches to the formation of a secure learning space in compliance with the rights and norms of physical, psychological, informational and ecological safety of each participant in the educational process.

2. Practical Measurement for Safe Learning Environment Creation in the Midst of War

The survey was concentrated on the analysis of inputs, outputs and outcomes of different aspects of safe learning environment, in particular its physical, psychological, informational, and ecological aspects, and examination of university policies and strategies regarding safe learning environment creation, see Table 1.

Table 1*University policies and strategies regarding safe learning environment creation*

Physical Safety	Inputs	– The educational process at SNAU was carried out in a blended format: lectures were held online on Zoom or Google Meet platforms, practical classes and laboratory work were held in classrooms, but during air raid alerts the classes were transferred to the shelters. – The students who lived abroad, or in the areas where hostilities were taking place, or in an occupied territory, studied remotely in synchronous (on Zoom or Google Meet platforms) or asynchronous mode (on Moodle platform). – In the case of some emergencies due to hostilities, the educational process took place remotely via Moodle platform. – Construction of a multifunctional shelter in accordance with the norms of inclusiveness and barrier-freeness with classrooms provided with Internet access and multimedia technologies. The accommodation included a study area, a dining area, and a recreation area, a sports room, a first aid station, and a water closet adapted for people with disabilities as well. – Application of purchased portable charging stations EcoFlow DELTA as well as a generator provided by the Food and Agriculture Organization of the United Nations. Source: (SNAU, 2025) Report of the Rector of Sumy National Agrarian University for 2025 (https://snau.edu.ua).
	Outputs	Thanks to Zoom, Google Meet, and Moodle online platforms as well as to the shelters and portable charging stations, the students had the opportunity not only to continue their study during the martial law and emergency or planned power outages, but also to participate in webinars, conferences, and free time activities during air raid alerts.
Psychological Aspect	Inputs	Social and Psychological Service at SNAU Its activities were aimed at ensuring psychological comfort, social protection, and personal development of all participants in the educational process.
	Outputs	– Creating a favorable supportive learning environment based on tolerance and mutual respect – Quest aimed at supporting the psychological state of students within the framework of an all-Ukrainian mental health support programme “How are you?” – Trainings on learning effective self-help techniques that help to cope with stress and maintain mental health – Individual and group counseling of students, faculty, and staff to overcome stress, anxiety, personal and interpersonal difficulties – Trainings, discussions, lectures on the prevention of bullying, violence, suicidal behavior, etc.
Information Safety	Inputs	– A training course “Major EU practices on media literacy for boosting students’ critical thinking in the frame of the target language learning” within the implementation of the Erasmus+ Jean Monnet Module project “EU strategies extrapolation for boosting students’ media literacy in Ukrainian HE” (EUSELENA– ERASMUS-JMO-2022-HEI-TCH-RSCH) (https://jm.snau.edu.ua/euselena/). – During teaching the course, significant attention was paid to issues of disinformation, mechanisms for detecting fakes, security in the information space, and information hygiene.

	Outputs	Students learned about manipulative technologies on television, in print media, and on social media; learn to distinguish between disinformation, fakes, and manipulation; gain knowledge about digital etiquette and the rules of social media culture during wartime, etc. After completing the course, students gained a set of various competencies, namely: – awareness of media safety, media ethics, and the culture of communication within the media environment; – ability to apply acquired knowledge and skills to create a safe media environment and interact with its objects and participants through critical thinking; – the ability to refute fake content and false information, as well as counter disinformation and negative propaganda in wartime.
		– “Advanced Course in EU Environmental Safety and Climate Policy”. The training was held online as part of Erasmus+ Jean Monnet Chair “EU Climate Leadership” project 620031-EPP-1-2020-1-UA-EPPJMO-CHAIR from February to the end of May, 2023 (https://jm.snau.edu.ua/en/). – Programme “Training of experts to assess soils damaged due to hostilities” has being implemented since 2023 within the framework of cooperation between SNAU and the Royal Agricultural University (Great Britain). Target group: former military personnel with a background in agriculture, GIS, environmental protection (https://projects.snau.edu.ua/soil-expert/en/training-of-experts-to-assess-soils-damaged-due-to-hostilities/).
Ecological Aspect	Inputs	– Agreement on scientific and technical cooperation aimed at restoring soils in territories affected by hostilities signed in 2024 between SNAU and the international organization The HALO Trust. Under the agreement, SNAU is responsible for conducting extensive soil analysis of the areas affected by the fighting. Based on the results, the university will provide recommendations for further remediation and restoration of these areas. The research will be carried out on the basis of the center for collective use of scientific equipment for the latest agricultural technologies “Laboratory of Ecological Agriculture and Nature Management”. – In December 2024, a Memorandum of Cooperation was signed between SNAU and the Department of Environmental Protection and Natural Resources of Sumy Regional State Administration. SNAU joined the project to monitor the state of atmospheric air using modern equipment. Within the framework of the State Monitoring Programme for Sumy Zone for 2022-2026, modern indicative observation points for the state of atmospheric air are being established and a software and hardware complex for data analysis and storage is being implemented. – The university is also a permanent partner of Sumy authorities in creating projects for landscaping public spaces and recreation areas of the city as one of the key aspects of landscaping is its ability to improve air quality.

Outputs

As a result, the course participants presented a wide range of project topics – from climate plans of several cities to analysis of the impact of climate change on various sectors of the economy.

In particular, the analysis of climate risks was carried out for some regions and cities not only in Ukraine but also in the world, and recommendations were formulated regarding actions to combat climate change and adapt to it at different levels (international, national, regional, and individual).

The students learned to renovate the quality of soil contaminated by the war in Ukraine.

The scientists of SNAU were engaged in research and restoration of soils affected by military actions in cooperation with the specialists of Royal Agricultural University. They improved their qualifications on the basis of this educational institution, as well as at Bern University of Applied Sciences (Switzerland).

A laboratory “Soil Quality Assessment” has been created where the scientists and students of SNAU are able to conduct high-precision research using modern equipment, which allows for detailed analysis of soil composition for heavy metal content, that is important for assessing their ecological status and suitability for agricultural use, as well as implementing innovative solutions in the field of soil science and ecology.

ENVEA device (made in France), model CAIRNET, provides monitoring such pollutants as sulfur dioxide, nitrogen dioxide, carbon monoxide, PM10, PM2.5, volatile organic compounds, and ozone in 5 cities of Sumy region.

More than 300 trees grown by SNAU students have already been planted in Sumy.

DISCUSSION

The outcomes of the study proved, that physical safety is an integral and even leading component of the protection and well-being of students during military conflicts (Zamir & Kostikova, 2025). War conditions create special challenges and threats to physical safety, especially in the context of the activities of educational institutions, where a large number of students are concentrated. Regardless of the form of organization of the educational process (blended, distance, or full-time), the administration of an educational institution must systematically monitor compliance with a safe educational space in accordance with regulatory documents (Horikhovskiy & Ohanesian, 2022).

Most respondents agreed that in the conditions of the direct threat to students' and faculty's lives, if the campus is situated in close proximity to the military frontline, the only possible decision is online educational process. The distance learning format provides students with the opportunity to continue their education in Ukraine, regardless of their place of residence, including abroad (Kostikova et al, 2025). Distance learning prevails in the east and south of Ukraine, blended learning in central and northern Ukraine, blended learning in cities, and face-to-face learning is more common in rural areas in western Ukraine (Lokshyna et al., 2022).

When planning and organizing the educational process in educational institutions during the martial law period, it was necessary to take into account the peculiarities of each specific region, namely: proximity to the occupied territories, equipment and a permanent connection to the Internet for organizing the educational process; whether students have devices for using digital technologies and a permanent connection to the Internet for organizing the educational process (Holubnycha et al., 2024). Recently, due to planned and emergency power outages, it is very difficult to plan a lesson so that every

student can join in. Everyone is at home, and according to the outage schedules, at certain times some students have electricity and the Internet, while others do not. Another obstacle to the educational process is the “air alarm” signal. At this time, learners are in shelters and cannot attend lessons for safety reasons.

In the current realities of martial law and the transition of most educational institutions to a distance learning form using the web space, modern information space opens up wide opportunities for searching for any information and personal information about a person in particular, which does not contribute to the formation of a sense of security and the experience of psychological comfort and security of the individual in the modern information society (Belano & Aclao, 2025). Nowadays, a person is unlikely to be able to remain a ‘mystery’ for others, given the wide possibilities of the modern media space, Internet, social networks, etc. (Shin & Lee, 2025).

The wide opportunities that open up for establishing various kinds of communicative connections can often have negative consequences in our time, namely, falling under the influence of psychological manipulations, influencing the consciousness of the individual. Therefore, today the issues of psychological safety of the individual in the media environment are becoming increasingly relevant. This is especially important when it comes to adolescents and young people (Bilotserkovets et al., 2021).

All participants of the project admitted another crucial issue, a strong emotional impact that the military conflict, stress and experiences have caused on learners and academia. They agreed that the important role in the process of creating a psychologically safe environment is played by the administration, the psychological service of the educational institution, the activities of the entire teaching staff and each teacher in particular. In this regard, it becomes important to have specially organized training for a faculty who will be able to model and design an educational environment where the student’s personality will function freely, where all participants in the educational process will feel protected, emotional comfort, meet basic needs, and maintain and strengthen mental health. And it is possible only if the general culture of the educational institution is based on respect for the individual; a friendly and positive attitude; trust in relationships; dialogue, interaction, and mutual respect; distributed leadership; principles of social partnership, namely, equality of parties, voluntary acceptance of obligations, mandatory fulfillment of agreements (Hardie, 2022).

Environmental safety has become particularly acute due to the deterioration of the environmental situation in Ukraine, because parts of our lands, especially in the eastern territories (Donbas), and over the past year in the northern territories (Slobozhanshyna), as well as in the southern regions (The Black Sea region, Tavria), have become practically unusable (Dolzhenkova & Nazarenko, 2024). Regarding ecological safety as an essential part of national security (Kalda et al., 2023) and taking responsibility for it, the discipline “Environmental Safety” is taught to SNAU students.

After completing the course, they are able to determine the conditions for the formation of danger in all components of the natural environment under the influence of natural and anthropogenic factors, and find out the methodology for assessing and mitigating risk situations and sources of risk associated with natural and man-made phenomena, social and professional human activities.

CONCLUSIONS

Therefore, it was revealed that the evolution of the concept of “safe learning environment” (SLE) has been influenced by significant cultural, legislative and societal conditions. Eventually, it has referred to physical protection, prevention of accidents,

crimes, and emergencies in an educational institution. However, over time, it has been recognized that safety goes far beyond physical measures and today the discourse around this concept has expanded to the terminology of a SLE, which includes psychological, ecological and digital safety, a supportive environment where students can feel comfortable and non-discriminatory.

Creating SLE in the period of martial law is pivotal for the academic success and personal well-being of students and requires a comprehensive approach that will include the following key components: organization and maintenance of security (physical, environmental, psychological, information) of the entire educational infrastructure; ensuring equal access to educational resources, since the conditions of military conflict quite often lead to overlapping access to educational resources, especially for those regions that have suffered the most from Russian aggression; implementation of psychological support and effective psychological and pedagogical interaction.

CONFLICT OF INTERESTS

The authors declare that *Tetiana Fomenko* is a member of the journal's Editorial Board but was not involved in any aspect of the editorial or peer-review process for this manuscript, including the publication decision.

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ASSESSMENT OF STUDENTS AWARENESS OF GLOCAL SUSTAINABILITY CHALLENGES IN HIGH SCHOOLS

ОЦІНЮВАННЯ ОБІЗНАНОСТІ УЧНІВ ЩОДО ГЛОБАЛЬНИХ ВИКЛИКІВ СТАЛОГО РОЗВИТКУ У СТАРШИХ КЛАСАХ

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ABSTRACT

Sustainability education has become increasingly important in preparing young people to respond to interconnected global and local environmental challenges. Schools play a critical role in shaping students' understanding of sustainable development and their capacity to act responsibly within their communities.

Освіта у сфері сталого розвитку стає дедалі важливішою у підготовці молоді до реагування на взаємопов'язані глобальні та місцеві екологічні проблеми. Школи відіграють вирішальну роль у формуванні розуміння учнями сталого розвитку та їхньої здатності діяти відповідально у своїх громадах.

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Purpose. This study assessed high school students' awareness of glocal sustainability challenges, focusing on their knowledge of sustainability concepts, principles, and issues as well as their ability to link global phenomena with local realities.

Methodology. The research used a descriptive survey design involving 177 undergraduates from the University of Johannesburg, South Africa. Data were analyzed using descriptive statistics.

Results. Results showed that students had a strong conceptual awareness of sustainability principles, including equal access to education, gender equality, human rights, biodiversity conservation, and responsible corporate behavior. Over 90% recognized the importance of education, peace, and environmental stewardship for sustainable development, and most were aware of global challenges such as climate change, waste management, and resource equity. However, the study found a gap between students' theoretical knowledge and practical local action, particularly in areas like water conservation and disaster preparedness.

Conclusion. The findings suggest that while students understand sustainability conceptually, their learning remains abstract. The study recommends more experiential, context-based learning, improved teacher training, and stronger school-community partnerships to better integrate global sustainability ideas with local practices.

Keywords: environmental awareness, experiential learning, global sustainability, sustainable development education, theory-practice gap.

Мета. Це дослідження оцінило обізнаність учнів старших класів щодо глобальних викликів сталого розвитку, зосереджуючись на їхніх знаннях концепцій, принципів та проблем сталого розвитку, а також на їхній здатності пов'язувати глобальні явища з місцевими реаліями.

Методологія. У дослідженні використовувався описовий дизайн опитування, в якому взяли участь 177 колишніх учнів шкіл, а зараз студентів Йоганнесбурзького університету, Південна Африка. Дані були проаналізовані за допомогою описової статистики.

Результати. Результати показали, що учні мали сильне концептуальне усвідомлення принципів сталого розвитку, включаючи рівний доступ до освіти, гендерну рівність, права людини, збереження біорізноманіття та відповідальну корпоративну поведінку. Понад 90% визнали важливість освіти, миру та екологічного управління для сталого розвитку, і більшість була обізнана з глобальними викликами, такими як зміна клімату, управління відходами та рівність ресурсів. Однак, дослідження виявило розрив між теоретичними знаннями та практичними діями на місцевому рівні, особливо в таких сферах, як збереження водних ресурсів та готовність до стихійних лих.

Висновки. Результати дослідження свідчать про те, що хоча учні розуміють сталий розвиток концептуально, їхнє навчання залишається абстрактним. Дослідження рекомендує більше емпіричного, контекстно-орієнтованого навчання, покращення підготовки вчителів та зміцнення партнерства між школою та громадою для кращої інтеграції ідей глобального сталого розвитку з місцевими практиками.

Ключові слова: екологічна свідомість, експериментальне навчання, глобальна сталість, освіта для сталого розвитку, розрив між теорією і практикою.

INTRODUCTION

Sustainability has become a topical subject and pedagogical concern in recent times because its environmental, social and economic dimensions are highly interconnected and time sensitive. While conventional discussions often treat sustainability at a global scale focusing on planetary boundaries, climate change, biodiversity loss and the Sustainable Development Goals (SDGs) these global dynamics are always experienced through local realities such as community water shortages, waste management practices, urban heat islands, and livelihood shocks (Tshabalala et al., 2025; Azeez et al., 2024). The term glocal sustainability therefore captures the twofold insight that global drivers set the stage for broad risks and responsibilities, and local contexts shape how those risks appear, are felt and can be tackled in practice. This glocal lens invites learners

to trace linkages between large-scale drivers (for example, greenhouse-gas emissions or trade patterns) and proximate problems in their towns, neighbourhoods and schools, enabling more relevant, actionable learning.

Education systems are uniquely positioned to translate glocal complexity into informed civic capacity. High school learning is a formative stage where students develop critical thinking, civic identities and practical skills; it is therefore an opportunity to cultivate sustainability literacies that span systems thinking, local stewardship and collective action (Parayiwa & Shabalala, 2025; Mashaba et al., 2022). Empirical studies across southern Africa show that experiential, project-based and community-linked approaches (school gardening, recycling drives, participatory mapping) produce stronger commitments to local environmental practices than classroom-only instruction, because they help students make concrete links between abstract ideas (such as “carbon” or “resilience”) and everyday behaviours (Mbokazi et al., 2021; Parayiwa & Shabalala, 2025). Moreover, regional policy frameworks (e.g., SADC/UNESCO strategic guidance on Education for Sustainable Development) explicitly call for curricula that integrate local knowledge and multilingual, context-sensitive pedagogies to deepen relevance and inclusion.

Despite these policy commitments and series of successful programming, recent research suggests many students still hold limited or fragmented understandings of sustainability particularly when it comes to linking global phenomena to local causes and solutions. Large-scale analyses of climate change consciousness across African populations indicate that educational attainment, media access and geo-demographic factors strongly shape awareness, and that overall consciousness remains uneven across regions and social groups (Azeez et al., 2024; Zickafoose et al., 2024). School studies find a common pattern: students can often name environmental problems and SDG terms, yet lack depth in systems reasoning for example how local water use connects to watershed health and in translating knowledge into sustained local action (Padilla et al., 2025; Mbokazi et al., 2021). This fragmented learning reduces the potential of schooling to produce the type of civic agency and problem-solving habit that glocal sustainability requires.

There are several likely explanations for these gaps. First, curriculum and teacher preparation sometimes emphasise facts and definitions rather than inquiry-based, interdisciplinary learning that fosters systems thinking (Zickafoose et al., 2024; Mashaba et al., 2022). Second, inequalities in school resources and infrastructure including limited access to experiential learning tools, school-level electricity, and green spaces constrain opportunities for applied learning in many contexts (Zickafoose et al., 2024). Third, public information ecosystems matter: Afrobarometer-based analyses show that radio and local media remain dominant information channels in many African contexts, and that differential media access produces uneven exposure to climate and sustainability messaging (Azeez et al., 2024). Finally, teachers themselves often report needing more professional development in linking global frameworks like the SDGs to local curricular activities and community projects (Ekpoto et al., 2025; Parayiwa & Shabalala, 2025).

Given this background, there is an urgent need to assess students’ awareness of glocal sustainability challenges specifically in secondary schools. A focused assessment accomplishes three goals: it diagnoses which dimensions of glocal understanding are weak (knowledge, systems thinking, local action orientation), it identifies socio-demographic and schooling factors associated with stronger or weaker awareness, and it yields practical recommendations for curriculum redesign, teacher development, and

community partnerships that can bridge the global-local gap (Tshabalala et al., 2025; Mbokazi et al., 2021; UNESCO, ESD for 2030). This study aims to measure the depth and breadth of high-school students' glocal sustainability awareness and to map how that awareness correlates with school practices, teacher support and local information sources laying the groundwork for targeted pedagogical interventions that make sustainability education both meaningful and actionable.

Sustainability education in secondary schools is no longer an option but a necessity. Schools occupy a strategic position for shaping the knowledge, values and skills of young people who will inherit and act on the environmental and socio-economic consequences of today's decisions (Tshabalala et al., 2025; Parayiwa & Shabalala, 2025). By introducing learners to systems thinking, local stewardship, climate literacy and participatory problem-solving during the high-school years, educators can help build both the cognitive foundations and the civic dispositions required for lifelong sustainable practices and community resilience (Tshabalala et al., 2025; Mbokazi et al., 2021). Moreover, secondary schooling often coincides with adolescents forming civic identities and career interests; when sustainability is taught in ways that are experiential, localised and relevant, students are more likely to translate knowledge into action (Parayiwa & Shabalala, 2025; Mashaba et al., 2022).

There are several pragmatic reasons to prioritise sustainability education at the high-school level. First, empirical analyses across African contexts show that educational attainment is among the strongest predictors of climate and sustainability consciousness implying that improving secondary education content and access can lift community awareness broadly (Azeez et al., 2024). Second, high schools are ideal sites for applied learning such as school gardens, recycling and community mapping that link global phenomena (e.g., greenhouse-gas growth; biodiversity loss) to immediate, local manifestations (water scarcity, waste mismanagement, urban heat) a "glocal" pedagogical stance that increases relevance and agency (Tshabalala et al., 2025; Parayiwa & Shabalala, 2025). Third, regional policy frameworks and initiatives (including UNESCO's Education for Sustainable Development and continental youth-focused strategies) emphasise secondary education as a leverage point for reaching SDG targets and building green skills for Africa's young population (UNESCO, ESD for 2030; AfDB/continental youth papers). Together, these reasons argue for systematic reinforcement of sustainability across secondary curricula, teacher training and school-community partnerships.

Despite the clear importance of high-school sustainability education, recent research points to a worrying pattern of limited, uneven or fragmented student understanding of sustainability concepts and glocal linkages. Large-scale studies using Afrobarometer and national survey data report generally low to uneven climate-change consciousness across populations, with information channels (radio, local media), education level and urban-rural location shaping awareness differentially (Azeez et al., 2024). School-level research similarly finds that while many students can name environmental problems or SDG labels, they often lack depth in systems reasoning (for instance, how upstream land use affects local water quality) and struggle to translate classroom facts into sustained local action (Mbokazi et al., 2021; Mashaba et al., 2022). These findings suggest that familiarity with terms does not equate to a coherent, actionable understanding of glocal sustainability challenges.

A number of structural and pedagogical factors help explain this fragmentation. Curriculum designs that favour fact-memorisation over inquiry, inadequate pre- and in-

service teacher preparation for Education for Sustainable Development (ESD), and stark inequalities in school resources (lack of outdoor learning spaces, limited teaching materials, and intermittent electricity or internet in some schools) all constrain the depth and quality of sustainability learning (Ekpoto et al., 2025; Mhlongo et al., 2023; UNESCO analyses). Language and some other associated barriers where instruction is delivered in languages unfamiliar to learners also weaken the translation of scientific or global frameworks into locally intelligible actions (recent work on multilingual ESD in sub-Saharan Africa). Together, these constraints produce patchy learning outcomes: pockets of strong, practice-oriented awareness exist alongside large swaths of superficial or fragmented understanding.

Given these gaps, there is an urgent need for focused assessments of glocal sustainability awareness at the secondary level. Such an assessment should move beyond simple recall of facts and measure the breadth (knowledge of global and local issues), depth (systems reasoning), and orientation to action (intentions and participation in local sustainability practices) among students. Mapping which competencies are weak, and how they vary by socio-demographic and school-resource variables, can directly inform curriculum revisions, teacher professional development, and school-community interventions that aim to convert isolated knowledge into sustained, context-sensitive action (Mbokazi et al., 2021; Tshabalala et al., 2025; Parayiwa & Shabalala, 2025). This study responds to that need by assessing high-school students' awareness of glocal sustainability challenges and by identifying school and community correlates of stronger glocal understanding.

STATEMENT OF THE PROBLEM

Sustainability education is widely recognised as essential for preparing young people to respond to the complex environmental, social, and economic challenges of the 21st century. At the high school level, it offers a unique opportunity to equip learners with the knowledge, skills, and values necessary for both local action and global engagement (Tshabalala, Lunga, & Baloyi, 2025; Sterling, 2022). The “glocal” approach bridging global sustainability frameworks with local realities has been proposed as a powerful way to make sustainability learning more relevant and actionable. Despite this potential, evidence suggests that many high school students possess only limited or fragmented awareness of sustainability issues. In African contexts, while students may be able to name environmental problems or refer to the Sustainable Development Goals (SDGs), they often lack the systems thinking needed to understand the interconnections between global phenomena and their local impacts (Mbokazi et al., 2021).

Similarly, studies in other regions show that sustainability education often remains fact-based and siloed, with insufficient emphasis on interdisciplinary learning and real-world application (Biasutti & Frate, 2017). Several factors contribute to this gap. Curriculum designs may prioritise discrete subject knowledge over holistic sustainability competencies; teacher training in Education for Sustainable Development (ESD) is often inadequate; and disparities in school resources limit opportunities for experiential, project-based learning (UNESCO, 2020). As a result, students' understanding tends to be shallow, fragmented, and disconnected from practical action undermining the transformative potential of sustainability education.

This persistent gap between the intended outcomes of sustainability education and actual student awareness underscores the need for empirical assessments of high school students' understanding of glocal sustainability challenges. Without such

evidence, efforts to reform curricula, strengthen teacher training, and design relevant learning experiences risk being misaligned with learners' actual needs.

This study **aims** to address this gap by systematically evaluating students' awareness, thereby providing data to inform targeted educational interventions that foster informed, context-sensitive, and action-oriented sustainability competencies. The research is guided by the following objectives:

1. To evaluate students' knowledge and understanding of sustainability concepts, principles, and issues.
2. To determine the extent to which students are aware of global, national, and local sustainability challenges.

Research questions

1. What is the level of students' knowledge and understanding of sustainability concepts, principles, and issues?
2. To what extent are students aware of the global, national, and local sustainability challenges?

THEORETICAL FRAMEWORK

The study was hinged on Sustainable development theory. Sustainable development theory provides a fundamental lens for understanding how education can contribute to addressing pressing global and local sustainability challenges. The theory is rooted in the landmark 1987 Brundtland Commission Report, which defined sustainable development as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (World Commission on Environment and Development WCED, 1987). This concept highlights the importance of balancing economic growth, environmental protection, and social equity. In the context of high school education, sustainable development theory emphasizes the role of knowledge, values, and skills in shaping students' awareness of issues that cut across global concerns such as climate change, biodiversity loss, and resource depletion, and local challenges like waste management, deforestation, or water scarcity (UNESCO, 2017). The theory suggests that young people must be empowered through education to understand, internalize, and respond proactively to these interconnected challenges.

One of the central dimensions of sustainable development theory is its holistic and integrative approach. It rejects the treatment of environmental, economic, and social issues in isolation, stressing instead that sustainability requires an interdisciplinary understanding of how these domains interact (Hopwood et al., 2005). When applied to high schools, this theoretical orientation implies that awareness of global sustainability challenges cannot be cultivated through fragmented subject teaching alone but must be integrated across curricula, co-curricular activities, and institutional practices (Sterling, 2010). Students' awareness, therefore, is seen as an outcome of both formal and informal educational experiences that shape their capacity to think critically and act responsibly. This aligns with UNESCO's call for Education for Sustainable Development (ESD), which is grounded in sustainable development theory and positions students as active participants in building a more sustainable future (UNESCO, 2020).

Furthermore, sustainable development theory underscores the concept of intergenerational equity, which is highly relevant to high school education. Students, as the next generation of decision-makers, will inherit both the benefits and the burdens

of current global and local sustainability practices. Raising their awareness of these issues is not just an educational goal but a moral responsibility to equip them with the competencies necessary for sustainable living (Tilbury, 2011). This principle situates high school students at the heart of sustainability discourse, as their awareness and attitudes will significantly influence future societal choices. The theoretical framework thus provides justification for assessing students' awareness, since understanding the level of their knowledge and perception is crucial for evaluating how effectively schools are contributing to sustainable development goals.

Another core tenet of the theory is the concept of glocalism, which refers to the interplay between global issues and local contexts. Sustainable development theory recognizes that while sustainability challenges are global in scope, their manifestations and solutions are often context-specific (Robertson, 1995). For instance, global warming is a planetary concern, but its impact may be felt locally through irregular rainfall patterns or food insecurity. By adopting a glocal perspective, the theory affirms that awareness among high school students should not be limited to abstract global narratives but should connect with their immediate realities (Yli-Panula et al., 2020). This glocal framing ensures that students are able to link the larger global sustainability agenda with their local environments, thereby fostering relevance and engagement. Thus, the assessment of students' awareness becomes a practical step to examine how well they are making these connections.

Moreover, sustainable development theory stresses the importance of participatory learning and transformative education. It emphasizes that awareness is not merely about acquiring information but also about fostering critical thinking, problem-solving, and collaborative action (Sterling, 2010; Tilbury, 2011). In high school contexts, this translates into encouraging students to not only understand sustainability issues but also to engage in practices that reflect sustainable living, such as recycling, energy conservation, and community-based environmental projects. From this perspective, the theory provides a basis for assessing awareness not just in terms of cognitive knowledge but also affective and behavioral dimensions. Evaluating students' awareness of glocal sustainability challenges, therefore, becomes a way of assessing the transformative potential of education in shaping sustainable mindsets and behaviors.

Sustainable development theory is also relevant for its alignment with global policy frameworks such as the United Nations Sustainable Development Goals (SDGs). SDG 4 specifically emphasizes "quality education," with a sub-target focusing on education for sustainable development (UN, 2015). This global agenda reinforces the theoretical link between sustainable development and high school education, underscoring that students' awareness of sustainability challenges is a recognized international priority. By situating the study within this framework, the research draws on a robust theoretical foundation that is not only academically significant but also globally relevant. The theory thus legitimizes the importance of assessing students' awareness as a way of gauging progress toward achieving the broader sustainable development agenda.

Finally, the relevance of sustainable development theory to this research lies in its normative orientation: it does not simply describe what is, but prescribes what ought to be. It provides a guiding vision for education to move beyond traditional knowledge transmission toward fostering competencies for sustainable living (Hopwood et al., 2005). This makes it an appropriate framework for a study that seeks to assess students' awareness of sustainability challenges, since such assessment is a step toward aligning educational practice with the aspirations of sustainable development. The theory

ultimately frames high school students not as passive learners but as critical stakeholders in advancing sustainability, making their awareness an indispensable foundation for addressing both global and local challenges.

LITERATURE REVIEW

Origins and evolution of Education for Sustainable Development (ESD)

Education for Sustainable Development (ESD) emerged from the longer arc of environmental education but expanded its scope to integrate social justice, cultural diversity, and economic wellbeing with ecological integrity. Contemporary syntheses trace this evolution from early environmental education problem-awareness toward a transformative, competency-based paradigm that equips learners to think systemically, anticipate futures, collaborate, and act for change (UNESCO, 2020). A major accelerator was the United Nations Decade of ESD (2005–2014) and its successor, the Global Action Programme (2015–2019), which mainstreamed ESD in policy and practice and built global communities of practice. Subsequent evaluations emphasize how these initiatives scaled whole-institution approaches and multi-stakeholder partnerships while revealing persistent implementation gaps (UNESCO, 2021). With the adoption of the ESD for 2030 framework, ESD has been repositioned as a lever for achieving Sustainable Development Goal (SDG) 4.7 and the wider 2030 Agenda, prioritizing policy alignment, learning environments, educator capacity, youth engagement, and community action, shifting emphasis from projects to system-level transformation (UNESCO, 2020).

Recent bibliometric and scoping reviews show a rapid expansion and diversification of ESD scholarship since the late 1990s, with notable growth after 2015. These studies document increasing attention to competencies, whole-school approaches, and regional variations, alongside critiques of uneven quality and impact (Tafese & Kopp, 2025; Pan et al., 2024). At the same time, comparative studies highlight the conceptual distinction and continuing tensions between environmental education and ESD: while environmental education often centers ecological knowledge and conservation, ESD integrates sociocultural, political, and economic dimensions and orients learning toward sustainability action and justice (Suárez et al., 2023).

Field research continues to reveal challenges in curriculum integration, educator preparation, and assessment of action-oriented learning, even as student demand and policy momentum rise. For example, higher-education studies in Latin America report limited ESD literacy and uptake relative to environmental education, pointing to the need for clearer competencies, authentic projects, and institutional incentives (Acosta-Castellanos et al., 2024). Overall, ESD's evolution reflects a shift from awareness to agency: from teaching about sustainability to learning for sustainability, with current efforts focused on embedding ESD across systems, professions, and communities to catalyze just transitions by 2030 (UNESCO, 2020).

Overview of global and local sustainability challenges

Sustainability challenges have become pressing concerns at both global and local levels, with climate change, waste management, and water scarcity being among the most critical. Globally, climate change poses significant risks through rising temperatures, extreme weather events, and biodiversity loss, threatening ecosystems and human well-being (IPCC, 2022). Waste management is another critical issue, as rapid urbanization and consumption patterns have intensified solid waste generation, with inadequate disposal methods leading to pollution and health hazards (Kaza et al., 2018). Water

scarcity also remains a global challenge, particularly in arid and semi-arid regions, where demand surpasses supply due to population growth, industrialization, and agricultural use (UNESCO, 2020).

At the local level, many developing countries face amplified sustainability pressures. In African contexts, poor waste management infrastructure exacerbates urban pollution, leading to environmental degradation and public health risks (Kamugisha, & Mhanga, 2020). Similarly, water scarcity in regions such as sub-Saharan Africa is compounded by poor governance, climate variability, and inadequate investment in water infrastructure (Boretti & Rosa, 2019). Climate change impacts are also locally felt through shifting rainfall patterns, droughts, and flooding, which disrupt livelihoods and food security (Serdeczny et al., 2017).

Addressing these sustainability challenges requires integrated approaches that combine global cooperation with localized interventions. Climate action strategies, such as renewable energy transitions and carbon reduction policies, are vital at the global scale (IPCC, 2022), while community-based waste recycling and water conservation initiatives are essential at the local level (Kamugisha & Mhanga, 2020). Bridging global and local perspectives is thus critical for ensuring environmental sustainability and building resilient societies.

Importance of integrating glocal perspectives in education

Integrating glocal perspectives in education which refers to teaching that links global issues to learners' local realities enriches relevance, equity, and agency in African classrooms. Scholars argue that curricula become more meaningful when they braid local knowledges with planetary challenges such as climate risk, migration, and digital disruption, rather than importing "one-size-fits-all" models (Odora-Hoppers, 2002). In South Africa, Le Grange shows how place-based and sustainability-oriented teaching helps students read their communities as texts while cultivating capacities for global citizenship; this bridges the local lifeworld with wider ecological and social interdependence (Le Grange, 2022). Waghid extends this by advancing an African philosophy of higher education often framed through Ubuntu/glo-Ubuntu—that nurtures dialogical, justice-seeking citizenship across digital and physical spaces, making global citizenship education (GCE) both ethically grounded and context-responsive (Waghid, 2023).

Decolonial thinkers caution that "global" agendas can reproduce colonial hierarchies unless internationalisation becomes pluriversal translating across knowledge ecologies and centring Southern archives; a glocal lens is thus vital to build planetary curricula without erasing locality (Ndlovu-Gatsheni, 2020). Policy analyses further note that GCE targets under SDG 4 risk marginalising teachers and classroom enactment; empowering educators to design glocally relevant tasks, community inquiries, local data projects, and translocal dialogues improves both uptake and impact (Rose & Sayed, 2023). Overall, glocal integration cultivates learners who can diagnose local problems, mobilise indigenous and scientific knowledges, and collaborate beyond borders an educational praxis suited to Africa's development priorities and to shared global futures.

Bridging global knowledge with local action

Bridging global knowledge with local action has become an important framework in education, development, and sustainability discourses, as it emphasizes contextualizing universal knowledge to address community-specific needs. Scholars argue that global frameworks, such as the Sustainable Development Goals (SDGs), only become effective

when translated into locally relevant practices that reflect cultural, social, and economic realities (Sachs, 2015). In African contexts, integrating indigenous knowledge systems with global scientific insights enhances innovation and strengthens local ownership of solutions (Odora-Hoppers, 2002). For example, in environmental management, local communities' traditional ecological knowledge has been effectively combined with global climate models to address resource scarcity and climate adaptation (Nyong et al., 2007).

Education also serves as a critical arena for bridging global and local knowledge, where curricula reforms emphasize glocal perspectives that prepare learners for global citizenship while rooting them in local realities (Tikly, 2019). Furthermore, research shows that participatory approaches involving community actors are vital in ensuring that global ideas are not imposed but adapted in ways that resonate with local values and practices (Keevy & Chakroun, 2015). Ultimately, the bridging of global knowledge and local action is not a linear process but a dialogical one, requiring mutual respect, co-creation, and continuous negotiation to foster sustainable and contextually relevant change (Ostrom, 2010).

Studies on student awareness or attitudes toward sustainability

Studies on student awareness and attitudes toward sustainability have grown significantly in recent years, as higher education institutions are increasingly seen as key actors in advancing sustainable development. Research indicates that students generally recognize the importance of sustainability but often lack a comprehensive understanding of its multidimensional nature, which encompasses environmental, social, and economic dimensions (Lozano et al., 2017). In African contexts, studies reveal that while awareness is rising, sustainability is often perceived narrowly as environmental protection, with limited integration of social justice and economic equity issues (Sharma & Kelly, 2014). For instance, a study among South African university students showed strong concern for climate change but relatively weak engagement with sustainable consumption practices (Mawonde & Togo, 2019).

Globally, scholars have noted that positive attitudes toward sustainability do not always translate into sustainable behaviors, highlighting the gap between knowledge and practice (Barth & Rieckmann, 2016). Integrating sustainability into curricula has been shown to significantly improve students' awareness and foster critical thinking about global challenges and local responsibilities (Thomas, 2015). Furthermore, participatory learning methods that engage students in community projects have been found to deepen their commitment to sustainability beyond theoretical awareness (Lozano et al., 2017). Overall, the literature emphasizes that fostering meaningful student awareness and attitudes requires a holistic approach that combines curriculum reform, campus initiatives, and experiential learning opportunities (Mawonde & Togo, 2019).

METHODOLOGY

The study employed a descriptive survey research design. This choice of the design becomes necessary in order to gather accurate, systematic, and quantifiable information about the characteristics, opinions, attitudes, or behaviors of the study population. It is particularly suitable for education and social science research where the goal is not to manipulate variables but to describe phenomena as they naturally occur.

The study population comprise of all undergraduates in South African Universities. The sample for the 177 (40 male, 135 female and 2 non-binary) second to fourth year undergraduate students in the University of Johannesburg, South Africa as they were

high school students. The data collected was analysed using descriptive statistics. The research questions were analysed using frequencies percentages. Approval was gotten from the Research and Ethics Committee of the sampled university.

RESULTS AND INTERPRETATIONS

Research Questions 1:

What is the level of students' knowledge and understanding of sustainability concepts, principles, and issues.

Table 1

Evaluation of Sustainability Awareness and Knowledge Among Students

Constructs	Responses	Freq	Percent	Mean	Std. Dev.
To achieve sustainable development, every human being is entitled to access to good education	Disagree	5	2.8	4.38	0.75
	Neutral	13	7.3		
	Agree	69	39.0		
	Strong Agree	89	50.3		
	Don't Know	1	0.6		
	Total	177	100.0		
Peaceful conflict resolution through discussion is necessary for sustainable development	Strongly Disagree	1	0.6	4.45	0.73
	Disagree	3	1.7		
	Neutral	8	4.5		
	Agree	71	40.1		
	Strong Agree	92	52.0		
	Don't Know	2	1.1		
	Total	177	100.0		
Respecting human rights is necessary for sustainable development	Strongly Disagree	1	0.6	4.65	0.60
	Neutral	6	3.4		
	Agree	46	26.0		
	Strong Agree	124	70.1		
	Total	177	100.0		
We have to ensure that future generations enjoy the same quality of life as we do today	Strongly Disagree	2	1.1	4.47	0.87
	Disagree	6	3.4		
	Neutral	15	8.5		
	Agree	38	21.5		
	Strong Agree	116	65.5		
	Total	177	100.0		
Men and women throughout the world must be given the same opportunities for education and employment	Disagree	1	0.6	4.69	0.56
	Neutral	6	3.4		
	Agree	39	22.0		
	Strong Agree	131	74.0		
	Total	177	100.0		

Everyone ought to be allowed to acquire the knowledge, values and skills that are necessary to live sustainably	Strongly Disagree	1	0.6		
	Disagree	1	0.6		
	Neutral	3	1.7		
	Agree	33	18.6		
	Strong Agree	139	78.5		
	Total	177	100.0		
Elimination of poverty globally is necessary for sustainable development	Strongly Disagree	1	0.6	4.63	0.65
	Neutral	10	5.6		
	Agree	42	23.7		
	Strong Agree	124	70.1		
	Total	177	100.0		
Sustainable development requires that companies act responsibly toward their employees, customers and suppliers	Strongly Disagree	1	0.6	4.64	0.66
	Neutral	5	2.8		
	Agree	56	31.6		
	Strong Agree	108	61.0		
	Don't Know	7	4.0		
	Total	177	100.0		

Source: Field Survey, 2024

In Table 1, 89.3% of students agree or strongly agree that every human being is entitled to a good education as part of sustainable development. A similar pattern is seen with the idea that peaceful conflict resolution is necessary for sustainable development, with 92.1% agreeing or strongly agreeing. Also, 96.1% of students agree or strongly agree that respecting human rights is essential for sustainable development. While 87% agree or strongly agree that ensuring future generations enjoy the same quality of life is important. For equal opportunities for education and employment between men and women, 96% of students support this as necessary for sustainable development. Similarly, 70.1% of the students strongly agreed that eliminating poverty globally is essential for sustainable development, while 23.7% agreed. Only 5.6% of the students were neutral, and just 0.6% strongly disagreed. From the analysis of responses, it showed that students demonstrated satisfactory level of awareness of sustainability concepts, principles, and issues.

Research Questions 2:

To what extent are students aware of the global, national, and local sustainability challenges.

Table 2

Evaluation of Sustainability Awareness and Knowledge Among Students on Sustainability Challenges

Constructs	Responses	Freq	Precent	Mean	Std. Dev.
Sustainable development requires fair distribution of goods and services amongst people in the world	Strongly Disagree	1	0.6	4.59	0.65
	Neutral	8	4.5		
	Agree	55	31.1		
	Strong Agree	111	62.7		
	Don't Know	2	1.1		
	Total	177	100.0		

Companies in rich countries should give employees in poor nations the same working conditions	Strongly Disagree	2	1.1	4.34	0.93
	Disagree	5	2.8		
	Neutral	24	13.6		
	Agree	50	28.2		
	Strong Agree	91	51.4		
	Don't Know	5	2.8		
	Total	177	100.0		
Companies have a responsibility to reduce the use of packaging and disposable articles	Strongly Disagree	2	1.1	4.38	0.92
	Disagree	2	1.1		
	Neutral	25	14.1		
	Agree	55	31.1		
	Strong Agree	83	46.9		
	Don't Know	10	5.6		
	Total	177	100.0		
Preserving biological diversity is necessary for sustainable development	Strongly Disagree	1	0.6	4.51	0.75
	Neutral	16	9.0		
	Agree	56	31.6		
	Strong Agree	98	55.4		
	Don't Know	6	3.4		
	Total	177	100.0		
Reducing water consumption is necessary for sustainable development	Strongly Disagree	7	4.0	3.92	1.15
	Disagree	13	7.3		
	Neutral	37	20.9		
	Agree	56	31.6		
	Strong Agree	58	32.8		
	Don't Know	6	3.4		
	Total	177	100.0		
For sustainable development, people need to be educated on how to protect themselves against natural disasters	Strongly Disagree	1	0.6	4.40	0.81
	Disagree	3	1.7		
	Neutral	16	9.0		
	Agree	67	37.9		
	Strong Agree	85	48.0		
	Don't Know	5	2.8		
	Total	177	100.0		
Using more natural resources than we need threatens the health and well-being of people in the future	Disagree	2	1.1	4.64	0.65
	Neutral	9	5.1		
	Agree	42	23.7		
	Strong Agree	122	68.9		
	Don't Know	2	1.1		
	Total	177	100.0		

Stricter laws are needed to protect the environment	Neutral	11	6.2	4.66	0.63
	Agree	43	24.3		
	Strong Agree	119	67.2		
	Don't Know	4	2.3		
	Total	177	100.0		
It is important to take measures against problems that impact climate change	Strongly Disagree	2	1.1	4.58	0.70
	Neutral	8	4.5		
	Agree	51	28.8		
	Strong Agree	115	65.0		
	Don't Know	1	0.6		
	Total	177	100.0		

Source: Field Survey, 2024

In addition, 92.6% of the students strongly agreed or agreed that sustainable development requires companies to act responsibly toward their employees, customers, and suppliers, while 4% did not know. Only 0.6% strongly disagreed. Also, 93.8% of students strongly agreed or agreed that sustainable development requires fair distribution of goods and services, and 4.5% were neutral, while 1.1% did not. Similarly, 79.6% of students strongly agreed that companies in rich countries should ensure similar working conditions for employees in poor nations, while 13.6% remained neutral. 2.8% disagreed, and 2.8% did not know. On company Responsibility, 78% of students strongly agreed that companies have a responsibility to reduce the use of packaging and disposable articles, 14.1% were neutral, 5.6% did not know, and 1.1% disagreed. For preserving biodiversity, 84.2% strongly agreed or agreed that preserving biodiversity is necessary for sustainable development. 9% remained neutral, 3.4% did not know, and 0.6% strongly disagreed. The analysis of responses shows most undergraduates are aware of national, global and sustainability challenges and this was demonstrated in their responses to the various questions raised.

DISCUSSION

The findings indicate that students have satisfactory awareness of sustainability principles, aligning with earlier studies that highlight increasing environmental consciousness among African youth (Tshabalala, Lunga, & Baloyi, 2025). However, this awareness is primarily conceptual, with limited evidence of systems thinking or practical engagement. Similar patterns were observed by Mbokazi, Mkhasibe, and Uleanya (2021), who found that students could name environmental problems but struggled to translate knowledge into sustained local actions. Recent work by Ofori et al. (2023) also revealed that undergraduate students in Ghana demonstrated high climate knowledge but low participation in community sustainability practices, confirming this knowledge-action gap.

Moreover, structural barriers such as resource disparities and limited experiential opportunities, as noted by Mhlongo, Gumede, and Sibanda (2023), continue to constrain effective sustainability education. Curriculum emphasis on fact-based learning rather than participatory approaches compounds this gap (Zickafoose et al., 2024). Encouragingly, innovative pedagogical strategies (Fabeku & Fasanmi, 2024; Fasanmi, 2025) that integrate global perspectives with local realities, such as project-based learning and community-linked initiatives, have been shown to improve sustainability literacy (Uzorka et al., 2024). These findings collectively underscore the importance of

embedding glocal perspectives within high school curricula to ensure that awareness extends beyond abstract understanding into meaningful, action-oriented competencies.

RECOMMENDATIONS

Based on the findings, it is recommended that sustainability education in high schools be strengthened through experiential and project-based learning initiatives such as school gardens, recycling projects, and climate mapping, which allow students to engage practically with sustainability concepts. Teacher professional development should be prioritized to equip educators with the skills and tools to effectively link global sustainability frameworks with local realities. In addition, curricula should incorporate multilingual and culturally relevant pedagogies to ensure that sustainability education resonates with diverse learners. Building strong school–community partnerships will also help bridge the gap between classroom knowledge and local practices, enabling students to actively participate in initiatives like waste management, water conservation, and disaster preparedness.

Furthermore, student-led sustainability clubs and peer mentoring should be encouraged to foster ownership and responsibility among learners. Addressing resource disparities by improving school infrastructure, particularly providing outdoor learning spaces and access to technology, will enhance the effectiveness of sustainability education. Policymakers should ensure greater alignment between national curricula and international frameworks such as the Sustainable Development Goals and UNESCO's ESD 2030 roadmap. The integration of ICT tools and social media platforms can further expand access to sustainability knowledge, making it more engaging for students. Finally, continuous assessment of students' competencies should go beyond factual recall and emphasize systems thinking, problem-solving, and action-oriented engagement. Collectively, these recommendations highlight the need for a holistic, glocally relevant approach that nurtures sustainable attitudes and behaviors among high school students.

CONCLUSION

This study has shown that while high school students demonstrate strong conceptual awareness of sustainability principles such as human rights, gender equality, and environmental stewardship, their ability to translate this knowledge into practical, local actions remains limited.

Encouragingly, the findings reveal that most students recognize the importance of addressing global sustainability challenges; however, gaps persist in their engagement with local practices like water conservation and disaster preparedness. These results underscore the urgent need for educational approaches that bridge global frameworks with local realities through a glocal lens.

Strengthening teacher capacity, integrating experiential and project-based learning, and fostering partnerships between schools and communities are critical steps toward narrowing the knowledge–action gap. By embedding sustainability education more deeply into secondary school curricula and aligning it with both global priorities and local contexts, educators can cultivate informed, action-oriented citizens who are equipped to address the pressing environmental and social challenges of the 21st century.

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CONFLICT OF INTEREST

The authors declare that there is no conflict of interest regarding the publication of this paper.

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PROFESSIONAL DEVELOPMENT OF TEACHERS OF HIGHER EDUCATION INSTITUTIONS IN THE FIELD OF "TRANSPORT LOGISTICS" AND "OCCUPATIONAL SAFETY"

ПРОФЕСІЙНИЙ РОЗВИТОК ВИКЛАДАЧІВ ЗАКЛАДІВ ВИЩОЇ ОСВІТИ У ГАЛУЗІ «ТРАНСПОРТНА ЛОГІСТИКА» І «ОХОРОНА ПРАЦІ»

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ABSTRACT

Purpose. The article is devoted to the problem of professional development of teachers in higher professional education institutions in the fields of "Transport logistics" and "Occupational safety". The relevance and necessity of developing professional competence among teachers, focused on specific requirements and challenges, is substantiated.

Methodology. In the process of research, general scientific and pedagogical research methods were used: theoretical analysis (comparative, systemic, analytical-synthetic, inductive, deductive) to substantiate the above-mentioned problem. The basis for the implementation of the research goal is the use of such research methods as analysis (the main opportunities for professional development of teachers of labour protection and transport logistics in higher

Мета. Стаття присвячена проблемі професійного розвитку педагогів в закладах вищої професійної освіти у галузях «Транспортна логістика» і «Охорона праці». Обґрунтовано актуальність і необхідність розвивати у викладачів професійну компетентність, орієнтовану на специфічні вимоги та виклики.

Методологія. У процесі дослідження було використано загальнонаукові й педагогічні методи дослідження: теоретичні: аналіз (порівняльний, системний, аналітико-синтетичний, індуктивний, дедуктивний) для обґрунтування вищезазначеної проблеми. Основою реалізації дослідницької мети є використання таких методів дослідження як аналіз (проаналізовано основні можливості професійного розвитку педагогів з охорони праці та транспортної

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vocational education institutions are analyzed), the comparison method (ways of achieving professional development of teachers of the specified specialties in Ukraine and abroad, in particular in the European Union (EU)), generalization (it is determined how to overcome the shortcomings of advanced training for teachers of the two specialties in higher vocational education institutions).

Results. The ways of achieving professional development of teachers in the fields of "Transport logistics" and "Occupational safety" in Ukraine and abroad, in particular in the countries of the European Union, are substantiated. The main shortcomings of the advanced training system of teachers of the specified specialties in Ukraine are identified and proposals are made to overcome them. The results obtained can be used to form the professional development of teachers in the specialties of "Transport logistics" and "Occupational safety" in higher educational institutions.

Conclusions. As a result of this study, the main differences and common features between the two specialties. The main focus, format of the platforms and features of their study for teachers are determined. Recommendations are made on the choice of advanced training courses for the specified specialties. Different internship models are determined with consideration of the main characteristics that are relevant for each speciality taking into account their features. It is analyzed how the professional development of higher education teachers in the field of "transport logistics" and "occupational safety" is carried out, what are the features of the professional development of teachers in these specialties in Ukraine and abroad, in particular in the countries of the European Union. Interdisciplinary connections and techniques in teaching disciplines in the specialties of "Transport logistics" and "Occupational safety" are substantiated, which will increase the effectiveness of their teaching.

Keywords: higher education institution, occupational safety, professional development, professional education, teacher, transport logistics.

логістики в закладах вищої професійної освіти), метод порівняння (шляхи досягнення професійного розвитку педагогів з означених спеціальностей в Україні та закордоном, зокрема у Європейському Союзі), узагальнення (визначення подолання недоліків підвищення кваліфікації у викладачів двох спеціальностей в закладах вищої професійної освіти).

Результати. Обґрунтовано шляхи досягнення професійного розвитку педагогів у галузях «Транспортна логістика» і «Охорона праці» в Україні й закордоном, зокрема в країнах Європейського Союзу. Визначено основні недоліки системи підвищення кваліфікації педагогів з означених спеціальностей в Україні та запропоновано пропозиції щодо їх подолання. Отримані результати можуть бути використані для формування професійного розвитку педагогів зі спеціальностей «Транспортна логістика» та «Охорона праці» в закладах вищої освіти.

Conclusions. У результаті цього дослідження виокремлено основні відмінності та спільні риси між двома спеціальностями. Проаналізовано шляхи досягнення професійного розвитку педагогів означених спеціальностей на відповідних платформах навчання. Визначено основна спрямованість, формат платформ та особливості їх вивчення для викладачів. Зроблено рекомендації щодо вибору курсів підвищення кваліфікації означених спеціальностей. Визначено різні моделі стажування з розглядом основної характеристики, що актуальні для кожної зі спеціальностей з урахуванням їхніх особливостей. Проаналізовано, як здійснюється професійний розвиток педагогів закладів вищої освіти в галузі «Транспортна логістика» і «Охорона праці», які особливості професійного розвитку викладачів з цих спеціальностей в Україні і закордоном, зокрема в країнах Європейського Союзу. Обґрунтовано міждисциплінарні зв'язки та прийоми при викладанні дисциплін зі спеціальностей «Транспортна логістика» і «Охорона праці», що підвищить ефективність їх викладання.

Ключові слова: заклад вищої освіти, охорона праці, професійний розвиток, професійна освіта, викладач, транспортна логістика.

INTRODUCTION

In wartime conditions, the professional competence of teachers, in particular higher education institutions (HEIs) in the specialties of "Occupational safety" (OS) and "Transport logistics" (TL), is an important factor in ensuring the quality of education, organizing the educational process, training specialists for the domestic economy. The problem of professional development of teachers, taking into account the European integration of vocational education in Ukraine, is relevant.

Taking into account the Decree of the President of Ukraine dated February 24, 2022 No. 64/2022 "On the Introduction of Martial Law in Ukraine", approved by the Law of Ukraine dated February 24, 2022 No. 2102-IX, Decree of the President of Ukraine dated January 12, 2026 No. 40/2026, "On the Extension of the Term of Martial Law in Ukraine", approved by the Law of Ukraine dated January 14, 2026 No. 4757-IX, in accordance with Article 8 of the Law of Ukraine "On the Legal Regime of Martial Law", in order to ensure safe and harmless conditions for training and work, officials, in accordance with the Order of the Ministry of Education and Science of Ukraine dated December 20, 2024 No. 1770 "On Conducting Training, Advanced Training and Testing of Officials' Knowledge on Occupational Health and Safety life for 2026", the order on the main activity dated 01/26/2026 No. 24 "On conducting training, advanced training and testing of knowledge of officials on labour protection and life safety", officials and teachers must undergo advanced training in labour protection and life safety.

It is worth noting that the transport logistics industry is no less important in wartime. Highlighting the decision of the National Security and Defense Council of Ukraine of May 14, 2021 "On the Human Development Strategy" and put into effect by the Decree of the President of Ukraine No. 25/2021 of June 2, 2021, it should be noted that the training of teachers of higher education institutions in such important areas of education as labour protection and transport logistics, "lifelong learning, formal education, non-formal, informal (self-education) education play an increasingly important role in the acquisition of skills and abilities necessary to ensure social and economic activity".

Among the operational objectives of the Human Development Strategy were noted: "building a flexible adult education system; ensuring the development of non-formal education and encouraging lifelong learning; ensuring the organization of distance learning by educational institutions, the use of digital technologies in education". Among the main tasks are ensuring the development of digital skills of education seekers, teachers; launching an educational electronic platform as the basis for organizing distance learning, etc.

In this regard, in my opinion, the professional development of higher education teachers, in particular, in such important areas of activity as occupational safety and transport logistics, will be the basis that will influence the development of human potential in Ukraine during wartime.

METHODOLOGY

In the process of research, general scientific and pedagogical research methods were used: theoretical analysis (comparative, systemic, analytical-synthetic, inductive, deductive) to substantiate the above-mentioned problem. The basis for the implementation of the research goal is the use of such research methods as: analysis (the main opportunities for professional development of teachers of labour protection

and transport logistics in higher vocational education institutions were analyzed, the comparison method (ways of achieving professional development of teachers in the specified specialties in Ukraine and abroad, in particular in the EU), generalization (it was determined how to overcome the shortcomings of advanced training for teachers of two specialties in higher vocational education institutions).

RESULTS

A common trend for both specialties "Transport logistics" (TL) and "Occupational safety" (OS) is the integration of practical skills and digital technologies into curricula. Education is focused on specific industries and labour market needs, providing students with flexibility in choosing educational trajectories. For the TL specialties a single standard of training is important, since the specialty can be included in different fields of knowledge, which leads to a variety of programs. For the OS specialties it is important to balance the pedagogical and engineering components. Some programs train teachers, while others train technogenic safety and audit engineers.

Research areas in professional education for these two specialties are focused on training practical specialists taking into account modern trends and legislation. The goals are to create flexible programs that will combine fundamental knowledge with current technologies and labour market needs. Below is a comparison of key development areas for both specialties. For TL, we will consider three main areas: modernization of educational programs, organization of the educational process and creation of educational materials.

Modernization of educational programs involves an emphasis on the integration of modern technologies (geoinformation systems, information systems), development of model programs for specialized secondary education and integration with university courses.

Organization of the educational process includes the implementation of a practice-oriented approach through cooperation with employers, business games, academic mobility and the formation of an individual educational trajectory. Creation of educational resources is characterized by the development of digital and interactive educational resources for new programs. For OP, modernization of educational programs involves an emphasis on the development of audit and consulting competencies, the integration of digital security management systems and risk management into educational programs.

Organization of the educational process includes a combination of pedagogical and engineering training, with an emphasis on scientific research and experiments that prepare students for both teaching and practical work. The creation of educational resources is characterized by the specialization of programs for the needs of specific industries (housing and communal services, security (civil, educational, industrial, etc.) and their updating.

In this regard, the main opportunities for advanced training for teachers should be noted:

- certified programs in institutions of professional (vocational) higher education (HEI) in the format of developing and implementing model educational programs for professional higher education (in order to improve the quality of training of specialists in HEIs in relevant specialties and for teachers to obtain certificates of advanced training);

- participation in international academic mobility programs in the format of internships, joint projects, teaching at foreign universities (in order to exchange experience and integrate European educational standards with the implementation of curricula consistent with European requirements (as noted in the context of transport logistics or occupational safety);
- development of modern educational materials in the format of creating digital and interactive resources, adapting programs to needs of the considered industries (in order to update educational content in accordance with the requirements of the labour market, which is especially relevant for the specialities «Transport Logistics» and «Occupational Safety»).

I emphasize that there are many other formats for improving the professional development of teachers of higher education institutions in the field of «transport logistics» and «occupational safety». Among such formats, I note: short-term courses and trainings (online and offline) in pedagogy, the use of ICT, educational management; internships at production facilities or in specialized companies to update practical skills; participation in scientific and practical conferences, seminars, webinars; scientific internships and postdoctoral programs (for example, the Marie Skłodowska-Curie (MSCA) programs within Horizon Europe, which offer grants for researchers). It should be noted that for the professional development of teachers, there are many opportunities to master courses in the specified specialities.

Thus, for TL there is an opportunity to master courses:

- «International forwarding cargo» (key skills and content related to sea (air (road)) transportation, multimodal transportation, document management, etc.);
- «Organization of international cargo transportation» (key skills and content related to digital logistics solutions, transportation of special/dangerous cargo, etc.);
- «Organization of international cargo transportation» (key skills and content related to digital logistics solutions, transportation of special/dangerous cargo, etc.);
- «Transport logistics courses (various specializations)» (key skills and content related to dispatching, documents, route planning, etc.);
- «Advanced training courses for logisticians» (key skills and content related to deepening knowledge, updating legislative norms, safety, cost optimization, etc.)
- For OPs, there is an opportunity to master the courses:
- «Training and testing of knowledge in labour protection» (key skills and content of which are related to primary and recurrent training);
- «Advanced training in fire safety» (key skills and content of which are related to preparation for inspections by the State Emergency Service, development of documents, briefing system);
- «Advanced training for pedagogical workers in labour protection» (key skills and content of which are related to labour protection requirements in educational institutions, actions in emergency situations), etc.

In my opinion, the content and program of these courses for the above specialities differ legally and in terms of target nature. For OP, some courses are mandatory by law (in particular, related officials must periodically (at least once every three years) undergo training and knowledge testing. Workers in high-risk jobs undergo such training every year).

For TL, courses are mainly recommended or profile-based in nature to expand knowledge, master new tools or international standards. It is worth emphasizing that during advanced training, teachers who study logistics of special cargoes and occupational safety audits usually have questions that can be combined into several groups: training methodology, program content and professional challenges.

For the methodology of training and provision of practice, it is important to consider the following questions: «How to effectively model real logistics processes with dangerous, oversized or collapsible cargo in the classroom?», «What simulators, training equipment or software exist for training?», etc.

The relevance of knowledge and the legislative framework has the ability to reveal the questions: «Where to look for relevant international and national regulatory documents (for example, ADR, IATA)?», «How to integrate real cases of logistics during wartime into the program?», etc. Interdisciplinary communication will help to solve the question: «How to link the technical aspects of transportation with economic (insurance cost, optimization) and environmental issues?», etc.

I emphasize that among the questions of the OP courses, one of the important ones is the question of occupational safety auditing, which can also be presented in the form of three groups: the structure and content of the program, the effectiveness of training, psychological and ethical aspects.

The structure and content of the program considers what is the optimal balance between the theoretical regulatory framework and practical skills for conducting inspections, how to teach to formulate conclusions and recommendations.

The effectiveness of training makes it clear which modern methods of knowledge assessment (case studies, analysis of real accidents) are best used, how to teach effective communication with employers during an audit. Psychological and ethical aspects highlight the questions: «How to prepare students for possible conflict situations at the enterprise during an audit?», «Where is the line between audit and inspection control?», etc.

In my opinion, all these and other issues related to the specialties of TL and OP, in addition to the courses considered, can be mastered if: take an active part in specialized forums, webinars and conferences (for example, from the Professional Association of Occupational Safety Experts, logistics associations); take part in internships at production facilities, in logistics companies or audit firms to update practical experience; have cooperation with colleagues from other universities and practicing experts to develop joint cases and methods, etc.

It is worth noting that for the professional development of vocational education teachers, specialized platforms have appeared that offer certified courses in logistics: Continent Logic, FULA, School of Logistics (Anastasi), Training Centre «Business World Personnel», etc. Continent Logic has a main focus on practical online training with consideration of courses on the basics of logistics, dispatching, international transportation and transport management.

FULA has a focus on the accelerated course «Logist in a Month» (text and video lessons, tests, tools for work). School of Logistics (Anastasi) focuses on the in-depth course «Director of Logistics», covering warehouse and transport logistics. Training Centre «Business World Personnel» focuses on individual online training in logistics from the very beginning (with an emphasis on practice and career growth). Specialized platforms

offering certified courses are recommended for OP: Training and Consulting Centre «PROFITECH», Training Centre «EXPERT», Training Centre «Professional Safety», etc.

Training and Consulting Centre «PROFITECH» is mainly focused on distance learning courses with a wide range of programs: general course, fire safety, work at height, transport safety, etc. Training Centre «EXPERT» is focused on distance learning with dozens of areas, which helps in deepening industry knowledge. Training Centre «Professional Safety» focuses on distance learning on its own platform or via Zoom. Main courses: labour protection, electrical safety, fire safety.

In the process of studying courses in the above formats, and platforms are established: logistics courses are often focused on practice, and occupational safety courses are often focused on legislation and regulations; for the occupational safety direction, preference is given to those centres that issue state-standard certificates, which are official confirmation of qualifications; preference is given to courses that have feedback (individual consultations), access to materials, and the opportunity to study at a convenient time.

I emphasize that platforms can become a useful resource not only for personal learning, but also for searching for relevant cases, webinars, articles, examples, and contacts with practitioners for classes. In addition to the above factors regarding the professional development of teachers in both specialities, internships should be noted. Among the various internship models, the most significant are: scientific and pedagogical (pedagogical) and scientific and industrial (industrial). The scientific and pedagogical internship model is conducted in other higher education institutions or scientific institutions in order to improve pedagogical skills and learn new experience. Scientific and production (production) is carried out at enterprises, organizations, state institutions in order to deepen practical knowledge, master new technologies.

First of all, I note that since transport logistics and labor protection are practice-oriented industries, internships have their own nuances. For TL, large transport and logistics companies, ports, railway (road) transportation operators, manufacturing enterprises with a developed logistics department are preferred among internship bases. At these bases, real logistics schemes, software complexes, document management, warehouse and transport logistics management are studied. For OP, industrial enterprises (metallurgy, chemistry, construction), state labor inspectorate, security services of large corporations, auditing companies for certification of security systems prevail among internship bases.

The above-mentioned bases consider the analysis of occupational safety management systems (OSMS), safety audits, accident investigations, study of new regulatory requirements (NPAOP, DSTU) in practice, etc. Professional development of teachers in the field of transport logistics and occupational safety (OS) combines fundamental knowledge with constant updating of skills. It can be divided into basic training and continuous professional development.

The first step is to obtain fundamental education in one or both specialities. If for TL, attention is paid to improving fundamental knowledge in the direction of training related to transport technologies and logistics (with consideration of logistics, transportation organization, fleet and port management, international transportation, information systems, etc.), then for OS this direction is related to occupational safety and life safety (with consideration of the basics of occupational safety in transport and production, environmental safety, risk management, etc.). In our opinion, combined

programs are possible for mastering fundamental knowledge in both directions (to form a comprehensive understanding of the safety of logistics processes).

It is appropriate to add that for teachers, a practice-oriented approach is especially important, which often includes internships in leading companies, work with real cases and simulation software. Further development is built on the constant updating of knowledge and skills. In this case, it is advisable to compare the key aspects of this development in Ukraine and the EU countries.

In Ukraine, the main forms of professional development of teachers in the above specialties include advanced training courses, scientific and practical conferences, internships at enterprises, internal exchange of experience; in the EU countries – international specialized programs (in particular, MOST, SURCO), cooperation networks (for example, ENETOSH), academic mobility programs.

Current content focuses on Ukraine including adaptation to military conditions, cyber security, organization of work in conditions of uncertainty, digitalization of educational processes; in EU countries – digital transformation and the impact of artificial intelligence, green and energy transformation, psychosocial risk management.

In Ukraine, pedagogical methods include trainings, master classes, business games involving practitioners; in EU countries – a widespread constructivist approach: learning through experience (in particular, Port Virtual Lab simulators), project-based learning, the role of a teacher as a facilitator.

International cooperation in Ukraine is considered through bilateral agreements with individual institutions in Europe, Asia, North America on academic exchanges and internships; in EU countries – participation in European networks and initiatives (in particular, PactForSkills), joint projects within the Erasmus+ program are preferred.

It is worth noting that ENETOSH is a key European network for integrating safety and health into education, which is especially relevant for teachers of both specialties; Escolar Europe offers innovative programs for logistics teachers, focusing on simulations and digital skills.

My research has found that in organizing professional development for VET teachers in the specialties of TL and O there are weaknesses in Ukraine that need to be overcome. In my opinion, for the professional development of vocational education teachers in the above specialties in Ukraine, proposals at the state and university levels should be taken into account.

At the state level, I propose to:

- 1) update the regulatory framework and standards. To do this, professional standards for vocational education teachers should be developed taking into account modern requirements for logistics and occupational safety, including digital competencies, knowledge of international standards (ISO, ADR, IMO for logistics; ISO 45001 standards, EU directives for occupational safety); the State Standards of Vocational Education (DSPE) for these specialties should be updated, taking into account a practice-oriented approach, "green" skills and cybersecurity;
- 2) consider funding and support programs: introduce the creation of targeted state grants for teachers for internships in leading Ukrainian and international companies (logistics operators, manufacturing enterprises with an advanced occupational safety system); allocate quotas for free advanced training on the basis of author's courses from industry experts; master the "Exchange of Experience"

programs with financing for trips of teachers to advanced enterprises and educational institutions of the EU;

- 3) develop infrastructure: with the creation or modernization of a network of Regional Professional Development Centres with an emphasis on key industries. Equip them with modern simulators: logistics process simulators (WMS, TMS systems), risk analysis laboratories, samples of modern personal protective equipment and devices for measuring harmful factors; financial support for the creation of "Virtual Laboratories" and simulators (for example, virtual warehouses, modelling of emergency situations for labor protection);
- 4) establish partnerships with business and institutes: introduce legislative incentives for business (tax benefits) that participate in the training and professional development of teachers (organization of internships, lectures, joint projects, etc.); create Sectoral Councils for the Development of Vocational Education with the participation of the Ministry of Education, trade unions, associations of logisticians and occupational health and safety specialists to monitor skills needs.

At the university level, I propose to:

- 5) introduce individual development trajectories for teachers: with the introduction of a system of "personal educational budget" for each teacher, which he can spend on courses, internships or conferences of his own choice;
- 6) focus on practice-orientation and connection with the labor market: by introducing mandatory "professional internships" for teachers at operating enterprises with the mandatory subsequent inclusion of the experience gained in the curricula; by involving practitioners as expert teachers for part of the hours, conducting master classes, workshops; organize joint projects with business for students under the guidance of teachers, which will allow teachers to update their knowledge in the process;
- 7) develop digital and methodological competencies: internal training using modern software (logistics simulators, risk calculation tools), etc.; stimulation of the creation of author's online courses, methodological complexes and electronic textbooks with current cases; creation of communities of practice within the institution for the exchange of experience between teachers of different disciplines (for example, logisticians and labor protection to discuss supply chain safety);
- 8) implement international integration: increased participation in EU programs (Erasmus+, Horizon Europe, etc.) for personnel exchange, joint research and development of curricula; cooperation with foreign professional colleges and universities for double-degree programs for advanced training of teachers; support for teachers in passing international certifications;
- 9) create a single portal-platform with current materials, webinar recordings from industry experts, practical case templates and a forum for the exchange of experience;
- 10) hold annual All-Ukrainian forums (conferences, seminars, round tables) for teachers of the considered specialties with representatives of the state, business and international experts. Overcoming these shortcomings, taking into account the above proposals for improving qualifications in Ukraine and abroad, taking into account the specifics of their internship systems, in particular in the countries of

the European Union, will provide an opportunity for high-quality professional development.

DISCUSSION

The problem of professional development of HEI teachers, in particular in the field of physical education and physical culture, is constantly highlighted at the legislative and regulatory levels (On Professional Development of Employees, 2012 with amendments; On Higher Education, 2014; On Scientific and Scientific-Technical, 2015; Development Strategy, 2020 and 2021, etc.), at the scientific (Skyba et al., 2020), scientific-methodical and scientific-practical (Bulvinska et al., 2017), etc. This problem continues to be considered in connection with the transition to the European Educational Space. In connection with this important area of research, the continuous improvement of the professional development of teachers arises, which makes it possible to improve the quality of professional training of applicants, in particular, higher education in occupational safety and transport logistics (Rimske Ministerske, 2020; Skyba et al., 2020; Bulvinska et al., 2017).

The ability of Ukrainian teachers of higher education institutions to improve their professional level in European educational institutions requires an understanding of the features of the higher education system in the countries of the European Union (EU), in particular vocational education and training (CEDEFOP, 2024). It should be noted that the Finnish study by Virtanen (2020) indicates the feasibility of implementing digital platforms, such as MS Forms, which provides a more flexible system of assessment and development of teachers in educational institutions. Therefore, the use of such technologies makes it possible to constantly assess the level of professional competence of teachers, provide timely feedback and adjust their professional development strategies (Vaintraub, 2024), (Vaintraub, 2025).

In EU countries, improving the quality of the educational process is ensured at all levels with opportunities for all participants in the educational process (European Commission, 2022). The mobility of HEI teachers, in particular in the field of VET and VET, as well as the recognition of qualifications by EU countries, is facilitated by various joint programs, for example, Erasmus+, the European Qualifications Framework (EQF) and the Bologna Process. Some HEIs do not have access to appropriate digital tools, which complicates the alignment of national education systems in the field of digital education (OECD, 2023, p. 22–23).

As noted, international programs contribute to the deepening of cooperation between Ukrainian teachers and specialists from EU countries in the field of education, research and science. Among the European programs that contribute to the professional development of teachers and the development of strategic partnerships between universities, Erasmus+ should be noted (European Commission, 2023, p. 7–10). It is worth highlighting the Horizon Europe program, which is aimed at financially supporting scientific research and innovation (European Commission, 2026).

The Digital Education Action Plan 2021–2027 contributes to improving digital literacy and ensuring access to technologies in universities. The above programs provide significant financial benefits for Ukraine, which simplifies access to these opportunities (Ministry of Digital Transformation of Ukraine, 2022). It should be noted that the programs are mostly designed to be useful for experienced teachers and beginners (Smith, et al., 2022). In this aspect, it is crucial that the development of individual

teacher programs is provided for during professional development, including four stages for professional self-improvement (Schweikhardt, 2024).

All these programs increase the mobility of teachers, promote the exchange of best practices in the field of education and adaptation to European standards. According to the Law of Ukraine "On Professional (Vocational and Technical) Education" (2023), advanced training of teachers is carried out in higher educational institutions and their specialized faculties, as well as in other pedagogical higher educational institutions.

It is worth noting that teachers who improve their qualifications have a free choice of educational programs, forms of study, educational institutions, institutions and organizations, and other subjects of educational activity. The main forms of advanced training include: institutional (full-time (day or evening), correspondence, distance), dual, etc.) (Resolution of the Cabinet of Ministers of Ukraine "Some issues of advanced training of pedagogical and scientific and pedagogical workers", 2019).

Professional development of teachers includes: development of professional competencies (knowledge of academic disciplines, methods, technologies); knowledge of the psychological and physiological characteristics of education seekers; use of information and communication and digital technologies in the educational process; ability to form integrated, general and special competencies in education seekers, in particular, in transport logistics and labour protection; creation of a safe and inclusive educational environment; speech, digital, communication, social competence, etc. (Yevtushenko et al., 2022), (Yevtushenko & Tverdokhliebova, 2024).

I emphasize that the advanced training of teachers is organized through formal, non-formal and informal education with appropriate retraining and internship courses, trainings, webinars, etc. (Procedure for Advancement, p. 6, 2019).

CONCLUSIONS

The article examines current trends in the professional development of teachers in higher vocational education institutions in the fields of "transport logistics" and "occupational safety". The main differences and common features between the two specialties are highlighted. The ways of achieving professional development of teachers of the specified specialties on the relevant training platforms are analyzed. The main focus, format of the platforms and features of their study for teachers are determined. Recommendations are made on the choice of advanced training courses for the specified specialties. Different internship models are determined with consideration of the main characteristics that are relevant for each speciality taking into account their features.

It is analyzed how the professional development of higher education teachers in the field of "Transport logistics" and "Occupational safety" is carried out, what are the features of advanced training in these specialties in Ukraine and abroad, in particular in the countries of the European Union. Interdisciplinary connections and techniques in teaching disciplines in the specialties of "Transport logistics" and "Occupational safety" are substantiated, which will increase the effectiveness of their teaching. The main shortcomings of the system of advanced training of teachers in the specified specialties in Ukraine are identified and proposals are made to overcome them.

CONFLICT OF INTEREST

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TEACHERS' COMPETENCE IN USING DIGITAL VISUALISATION LEARNING MATERIALS FOR TEACHING READING COMPREHENSION IN PRIMARY SCHOOLS: CASE OF MOROGORO MUNICIPALITY COUNCIL, TANZANIA

КОМПЕТЕНТНІСТЬ ВЧИТЕЛІВ У ВИКОРИСТАННІ МАТЕРІАЛІВ ЦИФРОВОЇ
ВІЗУАЛІЗАЦІЇ ДЛЯ НАВЧАННЯ РОЗУМІННЯ ПРОЧИТАНОГО У ПОЧАТКОВИХ
ШКОЛАХ: ПРИКЛАД МУНІЦИПАЛЬНОЇ РАДИ МОРОГОРО, ТАНЗАНІЯ

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ABSTRACT

Purpose. This study focused on assessing teachers' pedagogical competence in using Digital Visualisation Learning (DVL) materials during Reading Comprehension instruction in primary schools. Specifically, the study seeks information on teachers' knowledge and skills in integrating DVL materials into English language reading comprehension instruction in primary schools. The study also examines factors affecting the use of digital visualisation in classroom situations.

Methodology. Anchored in the European Digital Competence Education Model, the study employed survey questionnaires, observations, and interviews as primary methods of data collection from respondents. The study adopted a mixed-methods approach within a case study research design, focusing on ten selected schools in Morogoro Municipality, Tanzania. One hundred and ten respondents were involved, including ten (10) primary school head teachers and one hundred (100) primary school English language teachers. Regression coefficients were used to analyse quantitative data, while qualitative data was analysed thematically.

Results. The findings show that teachers had low competence in using DVL materials in teaching reading comprehension in primary schools. The low competence is caused by a negative attitude, and low self-efficacy, limited access to technological resources, inadequate professional training and a lack of institutional and government support. The lack of teachers' competence indicates that in-service training is essential on bringing teachers' competence to improve teachers' competence in using digital visualisation in classrooms.

Conclusion. The study concludes that the availability of proper digital teaching and learning resources and teachers' positive attitude, should be prioritised to influence teachers' knowledge and skills on using DVL materials in primary schools teaching and learning. It is recommended in this study

Мета. Це дослідження зосереджено на оцінці педагогічної компетентності вчителів у використанні матеріалів цифрової візуалізації (DVL) під час навчання розуміння прочитаного у початкових школах. Зокрема, дослідження спрямоване на пошук інформації про знання та навички вчителів щодо інтеграції матеріалів цифрової візуалізації при навчанні розуміння прочитаного англійською мовою у початкових школах. У дослідженні також розглядаються фактори, що впливають на використання цифрової візуалізації в ситуаціях в класі.

Методологія. Спираючись на Європейську модель освіти з цифрової компетентності, дослідження використовувало анкети, спостереження та інтерв'ю як основні методи збору даних від респондентів. У дослідженні було використано змішаний метод у межах дизайну тематичного дослідження, зосередившись на десяти обраних школах муніципалітету Морогоро, Танзанія. У дослідженні взяли участь сто десять респондентів, включаючи десять (10) директорів початкових шкіл та сто (100) вчителів англійської мови початкових шкіл. Коефіцієнти регресії використовувалися для аналізу кількісних даних, тоді як якісні дані аналізувалися за допомогою тематичного аналізу.

Результати. Результати дослідження свідчать, що вчителі мають низький рівень компетентності у використанні матеріалів цифрової візуалізації (DVL) під час навчання розуміння прочитаного в початковій школі. Це зумовлено негативним ставленням, низькою самооцінкою ефективності, обмеженим доступом до технологічних ресурсів, недостатньою професійною підготовкою та браком інституційної й державної підтримки. Отримані дані підтверджують необхідність підвищення кваліфікації вчителів для ефективного використання цифрової візуалізації в освітньому процесі.

Висновок. Дослідження дійшло висновку, що наявність належних цифрових навчальних ресурсів та позитивне ставлення вчителів мають бути пріоритетними для впливу на знання та навички вчителів щодо використання матеріалів цифрової візуалізації у викладанні в початкових школах. У цьому

that the government and private sectors should invest in education and provide financial support for teachers' trainings about the use of digital tools in their everyday teaching and learning for global competitiveness. This study will further develop an intervention for upgrading teachers on how to integrate DVL materials in teaching English language subjects in Tanzania.

Keywords: digital literacy, ICT integration, multimedia tools, pedagogical skills, professional development, teacher training.

дослідженні рекомендується, щоб уряд та приватні сектори інвестували в освіту та надавали фінансову підтримку для навчання вчителів використанню цифрових інструментів у їхньому повсякденному викладанні для глобальної конкурентоспроможності. Це дослідження буде подальшою розробкою покращення підвищення кваліфікації вчителів щодо інтеграції матеріалів цифрової візуалізації у викладання англійської мови в Танзанії.

Ключові слова: цифрова грамотність, інтеграція інформаційно-комунікаційних технологій, мультимедійні інструменти, педагогічні навички, професійний розвиток, підготовка вчителів.

INTRODUCTION

Integrating Digital Visualisation Lesson (DVL) materials is not only used in education matters but also as a pedagogical tool in the teaching and learning process (Kumar et al. 2022). The National Educational Curriculum and various studies have insisted on integrating DVL materials, such as facilitating the availability of teaching and learning materials, and simplifying the lesson. The major challenge is teachers' competence to integrate DVL during the teaching and learning process (United Republic of Tanzania, 2019).

The integration of Digital Visualisation Lesson (DVL) materials extends beyond general educational purposes and serves as an essential pedagogical tool in the teaching and learning process (Kumar et al., 2022). The National Education Curriculum, alongside various scholarly studies, emphasises the incorporation of DVL materials to enhance the availability of instructional resources and to simplify lesson delivery. However, a major challenge lies in teachers' competence to effectively integrate DVL materials into classroom instruction (United Republic of Tanzania, 2019).

The use of DVL materials has been world widely emphasized because the material supports both teachers and students during teaching and learning of reading comprehension in the English language subject in primary schools (Fidelis et al., 2021). For example, a study conducted by Draper (2010) found that using DVL materials influences teachers in the teaching process and increases students' active participation in teaching and learning reading comprehension.

Another study conducted by the United Nations Organisation for Educational, Scientific, and Culture (2018) also reported that DVL materials support help teachers' preparation, knowledge, and skills while using in the teaching process. Furthermore, a study conducted by Kumar et al. (2022) shows that DVL materials improve teachers' knowledge, skills, and motivate them to use while teaching reading comprehension in primary schools. The evidence from literature insists that DVL materials are essential tools for enhancing reading comprehension in primary school level.

Moreover, teachers' competence is also insisted in reading comprehension instructions in the teaching and learning process. For example, a study conducted by Timotheou et al. (2023) reported that teachers have low competence in using technological tools in teaching and learning. Also, a study conducted by Many-Ikan et al. (2011) found that teachers have low competence in using the whiteboard in teaching and learning.

In Tanzanian context, the situation is almost similar to other countries as reported by various researchers. For example, a study conducted by Kalinga and Ndibalema (2023)

found that a lack of training on how to use technology affects teachers' competence in using technology in the teaching and learning process. This implies that lack of training and low experience in using technology are among the factors that affect teachers' competence in using DVL materials in the process of teaching reading comprehension in primary schools.

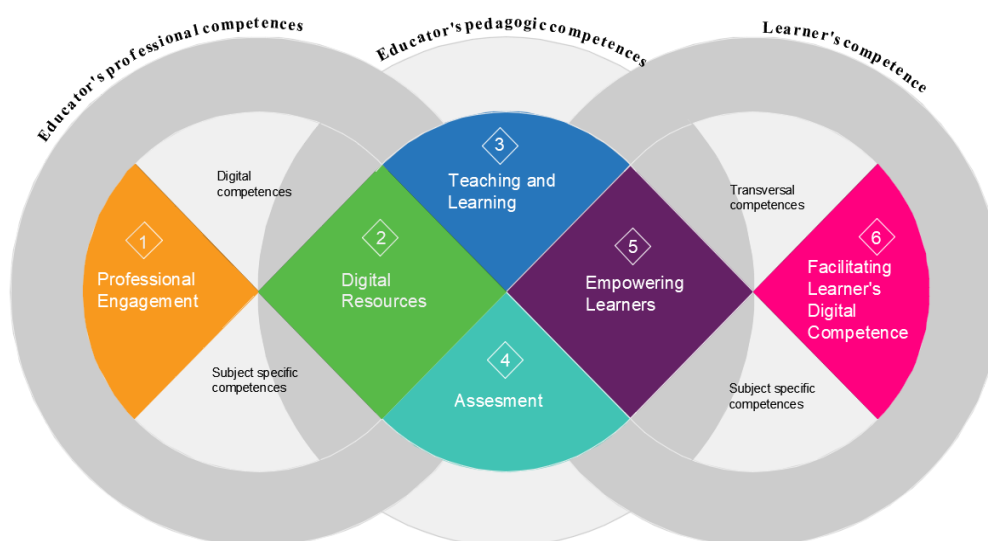
Initiatives have been taken in various countries. For example, a study conducted in China by Zhang, Liu & Zhou (2014) reported that competence standards for teachers were used to evaluate and measure the development of teachers' ICT competence. UNESCO (2018) established a digital competence standard for teachers on how to integrate digital tools in the class. Likewise, the United Republic of Tanzania (2019) reported that teachers need to be trained on the knowledge and skills of the currently occurring technological transformation in teaching and learning. This shows that there is a high demand of teachers training on integrating technology in classroom situations. This was also supported by the findings of Ndibalema (2022), who found that teachers have low competence in using technologies due to the lack of training.

Research also shows that there is a high demand for digital materials in the learning process. For example, a study conducted in Zanzibar by Hamad et al. (2023) found that teachers have low competence in integrating digital lesson contents due to a lack of appropriate digital materials in teaching descriptive writing in ordinary secondary schools. Thus, this study focused on assessing teachers' competence and factors affecting them in using DVL materials in teaching reading comprehension in Morogoro Municipality primary schools. It is expected that this study will contribute to teachers' awareness and readiness in using DVL materials in teaching and learning reading comprehension in primary schools.

The European Digital Competence Education Model identified by UNESCO, 2018 was employed in this study, whose main tenets focus on determining the role of educators in distinguishing the six areas in which 22 digital competences are expressed, Figure 1.

Figure 1

The European Digital Competence Education Model identified by UNESCO.



The Competences include professional engagement, digital resources, pedagogy (teaching and learning), curriculum and assessment, empowering learning, and facilitating learners' competence. The areas 2-4 focus on pedagogical competence for educators. In this study, the primary school teachers were considered educators who

were tested against prepared tools for measuring teachers' awareness and competence in using DVL materials.

This model has been selected to guide this study because it insists issues to be determined on assessing standard of teachers' pedagogical competence when using DVL materials in teaching and learning. In this study primary school teachers acted as educators; therefore, the researchers prepared a tool for measuring teachers' pedagogical competence on using DVL materials in teaching reading comprehension in primary schools.

Through this model researchers related it to this study as follow: First, model was helpful to measure teachers' digital competency (on organising) DVL materials in teaching reading comprehension. Second, this model is used to determine teachers' pedagogical competence (strategies and styles) in teaching and learning reading comprehension. Third, this model is used to measure teachers' ability on assessing (quiz, test and homework's) related to reading comprehension via digital way. Forth, this model was used to examine primary school teachers' ability on searching digital materials related to reading comprehension in online process. However, application of European Digital Competence Education Model in third world countries like Tanzania had challenges due to lack of funds on training teachers to integrate it in teaching and learning process.

Purpose. This study focused on assessing teachers' pedagogical competence in using Digital Visualisation Learning (DVL) materials during Reading Comprehension instruction in primary schools. Specifically, the study seeks information on teachers' knowledge and skills in integrating DVL materials into English language reading comprehension instruction in primary schools. The study also examines factors affecting the use of digital visualisation in classroom situations.

METHODOLOGY

The study employed a mixed-methods research approach to assess teachers' pedagogical competence in using DVL materials in teaching reading comprehension in primary schools. This approach was used to obtain both numerical and narrative data from respondents because the mixture adds value and authenticity to the information collected from respondents. A case study research design was used to get in-depth information from the respondents (Creswell & Creswell, 2018). The sample involved one hundred and ten (110) respondents from ten primary schools, which was obtained through a simple random sampling procedure to get one hundred teachers (ten from each selected school).

The purposive sampling procedure was used to select ten (10) schools from which ten head teachers were obtained. The study used an interview and a survey method to collect data from respondents. The interview was used to obtain in-depth information from the participants. Specifically, face-to-face interview was used for personal interaction, allowing for a comprehensive exploration of the research topic and the collection of rich qualitative data. The time range for each interview session was 45 to 60 minutes.

During the interview, the researcher recorded the information in the notebook, and the audio information was recorded in the digital tape recorder using an Android smartphone. The interview helps the interviewer and respondents to take part in formalised dialogues and allows the interviewer to shadow the interview guide correctly, and also digress if needed. The interview was managed using the interview guide. Furthermore, the interview guide was prepared in English and conducted in English language.

The survey method was used to seek perceptions, feeling and ideas from respondents about integrating DVL materials in teaching reading comprehension in primary schools. To ensure validity and of the data reduce bias, this study employed two research methods for data collection that provided sufficient information bias. Reliability was obtained through conducting a pilot study of the instruments, establishing a relation with research participants, and providing clarification on the completed research instruments (questionnaires). The test-retest technique of the research instruments was used to test the relevance and trustworthiness of the instruments. The reliability analysis using Cronbach's Alpha Coefficient was used to assess the reliability of questionnaire items before conducting further analysis (Cohen, et al, 2011).

The data obtained through interview was analysed in a thematic way by considering themes and sub-themes through six steps proposed by Braun and Clarke (2012). The first step involved familiarization with data, transcribing the data, translating, and reading, and re-reading data. The second step was establishing initial codes. The third step required assembling relevant codes into the themes in which they belong. The fourth stage was revising the theme and sub-themes, which also involved the modification of themes. The fifth step was naming and defining themes.

Lastly, the sixth step was writing up the report. Before going to the field for data collection, the researcher obtained ethical research clearance letters from various authorities such as the University of Dodoma through the post-graduate office of the Vice Chancellor, specifically the directorate of research, publication, and consultancy. Research clearance letters was also obtained from the Morogoro Regional Administrative Secretary (RAS) and the District Executive Director (DED) from Morogoro municipality.

RESULTS

In the contemporary primary education landscape, digital visualisation learning (DVL) materials such as interactive images, animated graphics, videos, infographics, and multimedia texts hold considerable promise for strengthening reading comprehension among young learners by rendering abstract textual content more concrete, supporting vocabulary development, enabling mental imagery, facilitating inferences, and boosting active engagement in diverse classroom environments.

This study investigates teachers' competence in using digital visualisation learning materials for teaching reading comprehension in primary schools within Morogoro Municipality Council, with the primary finding being teachers' low competence in integrating these materials, driven by contributing factors including negative attitudes and low self-efficacy toward technology, limited access to technological resources, inadequate professional training, and lack of institutional and government support; emphasizing the critical requirement for focused interventions in teacher capacity development, infrastructure provision, and ongoing support to enable effective DVL utilization and foster enhanced reading outcomes alongside educational equity.

Teachers' Low Competence in Integrating the DVL Materials in Teaching Reading Comprehension in Primary Schools

This section presents the results of the assessment of teachers' pedagogical competence on using the Play Cast digital visualisation tool in enhancing reading comprehension, with particular emphasis on professional engagement, teaching and learning, and digital skills. Regression coefficients analysis was used to determine the extent to which each predictor variable, such as professional engagement, teaching and learning, and digital skills. Specifically, it allowed us to quantify how changes in each

predictor are associated with changes in the predicted pedagogical competence score (B values) and to assess the statistical significance of these relationships (p-values). Table 1 illustrates the findings.

Table 1

Regression Coefficients of teachers' pedagogical competence on using DVL materials in teaching primary schools

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	1.783	.240		7.426	.000
Pedagogical competence	.041	.040	.105	1.031	.305
Professional engagement	-.247	.037	-.711	-6.651	.000
Teaching and learning	.054	.033	.140	1.621	.108
Digital skills	-.009	.041	-.019	-.220	.826

Note. Dependent Variable: Teacher's competence using digital visualisation tool.

With reference to the SPSS outputs presented in Table 1 above, the multiple regression equation ($Y = \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \epsilon$) became: X_1 -Pedagogical competence, X_2 -Professional engagement, X_3 -Teaching and learning, and X_4 -Digital skills

$$Y = 1.783 + 0.041X_1 + -0.247X_2 + 0.054X_3 + -0.009X_4 + 0.240$$

The findings from the regression equation indicate that teachers' pedagogical competence using DVL material was predicted to be 1.783 when all predictor variables (Pedagogical Competence, Professional Engagement, Teaching and Learning, and Digital Skills) were zero. The analysis revealed that Professional Engagement ($\beta = -0.247$, $p < 0.001$) was the only significant predictor, showing a negative relationship. This means that an increase in Professional Engagement was associated with a decrease in teachers' competence in digital visualization in this dataset.

Pedagogical Competence ($\beta = 0.041$, $p = 0.305$), Teaching and Learning ($\beta = 0.054$, $p = 0.108$), and Digital Skills ($\beta = -0.009$, $p = 0.826$) did not have statistically significant effects, suggesting they do not meaningfully predict teachers' competence in this model. Generally, the results indicate that competence in digital visualization is primarily influenced by factors other than general pedagogical skills, teaching practices, or digital skills; and the negative effect of Professional Engagement highlights the need to explore potential underlying causes, such as workload, focus on non-digital tasks, or insufficient training.

Furthermore, during the interview, the informants identified four major sub-themes, namely negative attitude and low self-efficacy, limited access to technological resources, inadequate training and professional development, as well as a lack of institutional and government support.

Negative Attitude and Low Self-efficacy

It was found from interviews that on the one hand, some teachers have a negative attitude towards using DVL materials during teaching because they lack awareness about using digital technological tools in teaching and learning. One head teacher said:

In my side, using technology in primary school level is a challenge because many teachers do not use technology. I think using DVL materials for us is still a challenge. Last, I can say that using DVL is not a good method in primary schools (Head teacher, School A, Interview, January 2026).

The statement above shows that a negative attitude is among the factors that affect teachers' competence in integrating the DVL materials in the classroom situation. However, the findings of this study specifically revealed that negative attitude is a barrier to teachers' competence on using DVL materials in teaching reading comprehension in primary schools.

On the other hand, other teachers showed positive attitude in using DVL materials in teaching reading comprehension in primary schools. Head teacher from school C explained:

I think, using technological tools in teaching and learning increases participation and interaction between teachers and students. But we lack confidence and experience to integrate it in the classroom (Head teacher, School B, Interview, January 2026)

The above quote shows that using technological tools is important to enhance teaching and learning.

Limited access to technological resources

In the second sub-theme, it was found that limited access to technological resources was among the factors that affect teachers' competence in using digital technological tools in teaching and learning. One head teacher from school D said:

In fact, in our school, we have two projectors and three computers. Some teachers like to integrate technology, but technological infrastructure remains a major barrier in enhancing teachers' pedagogical competence in primary schools (Head teacher, School B, Interview, January 2026).

The statement above reveals that limited accessibility of technological tools affects teachers on using technology in teaching primary schools.

Inadequate professional Training

During the interviews, the informants explained that the lack of sufficient training on how to use technological tools affects teachers' competence in using DVL materials for teaching and learning. One head teacher from school F claimed:

On my side, I have attended one seminar about ICT, but I have a low ability to integrate during teaching and learning. Also, there are a few teachers who attended training and seminars about the integration of ICT in the classroom situation (Head teacher, School C, Interview, January 2026)

The quotation above reveals that, without sustainable professional development (PD), teachers cannot integrate technology into the classroom.

Lack of Institutional and Government Support

During the interviews, the informants said that some primary schools lack government support and therefore they lack resources and training about digital technology. One head teacher commented:

Mmmh... we receive a few funds that are used to identify ICT tools in our school. Also, some NGOs such as VODACOM and YAS gave computers and printers, but

they did not arrange any seminar about how to integrate ICT in teaching and learning (Head teacher, School D, Interview, January 2026)

The quotation above shows that the lack of support from the government and private sectors on the use of technological tools in primary schools is a barrier that hinders teachers' knowledge and confidence to use technology in the teaching and learning process.

DISCUSSION

The findings from first sub-theme about negative attitude and low self-efficacy. The findings of this study concur with the study conducted by Joseph (2021) that teachers' negative attitude affects using ICT during the teaching and learning process. Also, results relate to study conducted in Indonesia by Katemba (2020) found that teachers have negative perception implementing technologies in language teaching and learning. Furthermore, the study conducted by Tiwari et al. (2022) provided similar results that teachers' attitude is essential for influencing them to use technological tools in teaching and learning.

However, findings of this study relate to the findings of the study conducted in Namibia by Shilongo (2023), which revealed that the lack of technological resources is among the factors that affect teachers' competence in using digital technology in teaching and learning. Moreover, the findings of the study conducted by Mushimiyimana et al. (2025) showed various factors that affect the use of the ICT in education, such as a lack of resources and low competence in using it. The findings show that the lack of technological resources, such as projectors and computer affect teachers' competence because they lack confidence in using them in their daily teaching activities. This implies that lack of technological resources affects teachers' competence to integrate DVL materials in primary schools (Kwambaza, 2024) while teaching reading comprehension.

Moreover, findings from second sub-theme about limited access to technological resources. This study relates to the study conducted by Masterson (2020), which reported that ICT facilitates teaching and learning, and makes the lesson easily understood. Furthermore, the study conducted by Kasuga (2016) provides similar findings that using ICT influences a learner-centered approach, motivates learners and increases active participation during the lesson presentation. Similarly, study conducted by Huang, Helgevold, and Lang (2021) stressed digital technologies, online learning and lesson study.

Also, study conducted by Ghomi and Redecker (2019) which insisted development and evaluation of a self-assessment instrument for teachers' digital competence. The focus was to show way how teachers needed to be competence on assessing students through digital manner. It was further revealed in this study that a few teachers who used DVL materials in their lessons were well understood and their lessons were enjoyable to the students. This implies that the positive attitude of teachers towards the use of DVL materials is essential to make them interested in engaging them during teaching and learning reading comprehension in primary schools.

Furthermore, findings from third sub-theme about inadequate professional training. The study concurs with Tanzania's National Framework for Teachers Continuous Professional Development (TCPD), which insists that teachers update their competence in order to cope with the global changes (United Republic of Tanzania, 2020). Also, results were related to the study conducted by Fallon (2020) who insisted digital literacy to digital competence for teachers. The study focused teachers framework on how to use digital tools in teaching and learning. Similar results were obtained in the study conducted by

Valverde-Berrocoso et al. (2021), which revealed that some teachers have low competence in using technology in teaching and learning.

Moreover, the study supports the ICT competence standard for teachers. The purpose is to insist on how teachers integrate technological tools in their daily teaching (United Republic of Tanzania..., 2015). However, the findings of this study go further show that the lack of professional development about technology affects their ability to integrate in teaching and learning reading comprehension in primary schools. This indicates that the lack of PD on integrating DVL materials is a barrier for primary school teachers. This is because teachers lack special or professional training on to use digital tools in teaching and learning reading comprehension.

In addition to that, finding of forth sub-theme about lack of institutional and government support. The findings of this study support the National curriculum framework for basic teachers in Tanzania, which insist teachers (Omollo et al., 2024) be competent in using technological tools in their teaching and learning process (United Republic of Tanzania, 2019). However, this study found that the policy of ICT was identified using digital technological tools in teaching and learning, but it is theoretically rather than actual practice.

In the similar vein, study conducted by Ilomäki and Lakkala (2018) insisted digital technology and practices for school improvement, the study also developed innovative digital school model. Moreover, study by Manyengo (2021) who insisted digitalization in teaching and education in the United Republic of Tanzania. Therefore, the study concludes that the availability of policy together with its actual implementation is essential for enhancing teachers' competence and confidence to use DVL materials in teaching and learning reading comprehension in primary schools.

CONCLUSIONS

The study concludes that in-service training about teachers' competence is essential for improving their competence in using DVL materials in the classroom. The study further concludes that the availability of proper digital teaching and learning resources, together with teachers' positive attitude, is important to influence teachers' knowledge and skills on the use of DVL materials in the primary schools' teaching and learning process.

It is recommended in this study that the government and private sectors should invest in education and provide financial support for teachers' training to use digital tools in their everyday teaching and learning for competitiveness in the global market economy. The study also recommends that further studies should be conducted focusing on the interventions to upgrade teachers on how to integrate DVL materials in teaching English language subject in Tanzania.

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CONFLICT OF INTERESTS

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MODIFICATION DYNAMICS OF INSTITUTIONAL CHANGES IN EDUCATION: AXIOLOGICAL ANALYSIS OF INFORMATION AND COMMUNICATION TECHNOLOGIES

МОДИФІКАЦІЙНА ДИНАМІКА ІНСТИТУЦІЙНИХ ЗМІН В ОСВІТІ:
АКСІОЛОГІЧНИЙ АНАЛІЗ ІНФОРМАЦІЙНО-КОМУНІКАЦІЙНИХ ТЕХНОЛОГІЙ

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ABSTRACT

Purpose. The purpose of the article is to investigate the modification dynamics of institutional changes in education and to conduct an axiological analysis of the role of information and communication technologies in this process.

Methodology. In order to study the scientific literature on the issue, we used a number of methods: analysis, synthesis, comparison, generalisation and systematisation. Content analysis of scientific publications in recent years has enabled us to identify current trends in global and national digitalisation and outline the problem area of the study. The empirical part of the study was implemented through a survey aimed at identifying the characteristics of institutional transformations caused by ICT integration and analysing their axiological impact on participants in the educational process.

Results. The empirical data obtained during the study indicate that respondents have a predominantly positive perception of the functional role of ICT in modern educational processes. Thus, 42% of respondents believe that digital technologies contribute to strengthening the humanistic potential of pedagogical interaction. About 30% of respondents emphasise the emergence of new forms of communication and interaction, which indicates a transformation of the traditional structure of educational communication. At the same time, 12% of participants note a decrease in the level of

Мета статті – дослідити модифікаційну динаміку інституційних змін в освіті та здійснити аксіологічний аналіз ролі інформаційно-комунікаційних технологій (ІКТ) у цьому процесі.

Методологія. З метою опрацювання наукової літератури з означеної проблеми нами використано низку методів: аналіз, синтез, порівняння, узагальнення та систематизація. Контент-аналіз наукових публікацій за останні роки дозволив виокремити актуальні тенденції глобальної та національної цифровізації й окреслити проблемне поле дослідження. Емпіричну частину дослідження було реалізовано шляхом проведення опитування, метою якого стало виявлення особливостей інституційних трансформацій, зумовлених інтеграцією ІКТ, та аналіз їхнього аксіологічного впливу на учасників освітнього процесу.

Результати. Емпіричні дані, отримані в ході дослідження, засвідчують, що респонденти переважно позитивно оцінюють функціональну роль інформаційно-комунікаційних технологій у сучасних освітніх процесах. Зокрема, 42% опитаних вважають, що цифрові технології сприяють посиленню гуманістичного потенціалу педагогічної взаємодії. Близько 30% респондентів наголошують на появі нових форм комунікації та взаємодії, що свідчить про трансформацію традиційної структури освітньої комунікації. Водночас 12% учасників відзначають зниження рівня особистісного контакту, що вказує на

personal contact, which indicates the presence of certain barriers in the humanitarian dimension of digitalisation, associated with the risk of reducing interpersonal relationships and the emotional component of pedagogical interaction.

Conclusions. Analysis of the materials we have studied allows us to conclude that digital transformation initiates modifications in the institutional structure of education, covering both functional and axiological components. Informational and communicative technologies act as a catalyst for change, ensuring: the expansion of the information capabilities of the educational environment; the formation of new communication models; the increase of cognitive autonomy and digital competence of participants in the educational process; the innovative renewal of professional activity; the reorientation of the value priorities of education in accordance with the requirements of digital culture.

Keywords: digital competence, digital culture, digital technologies, digital transformation of education, digitalisation, digitalisation of educational institutions, innovative activity.

наявність певних бар'єрів у гуманітарному вимірі цифровізації, пов'язаних із ризиком послаблення міжособистісних зв'язків та емоційного компонента педагогічної взаємодії.

Висновки. Аналіз опрацьованих матеріалів дозволяє констатувати, що цифрова трансформація ініціює модифікаційні зрушення в інституційній структурі освіти, які охоплюють як функціональні, так і аксіологічні компоненти. Інформаційно-комунікаційні технології виконують роль каталізатора змін, забезпечуючи: розширення інформаційних можливостей освітнього середовища; формування нових комунікаційних моделей; підвищення когнітивної автономії та цифрової компетентності учасників освітнього процесу; інноваційне оновлення професійної діяльності; переорієнтацію ціннісних пріоритетів освіти відповідно до вимог цифрової культури.

Ключові слова: цифрова компетентність, цифрова культура, цифрові технології, цифрова трансформація освіти, цифровізація, цифровізація закладів освіти, інноваційна діяльність.

INTRODUCTION

The current realities of the development of the education system are characterised by intensive institutional transformations caused by global processes of digitalisation, changes in socio-cultural orientations, and axiological shifts in the system of knowledge values. Education is gradually ceasing to be a traditional structure and is acquiring the characteristics of an open, innovation-oriented system. In this context, the dynamic nature of institutional changes in education manifests itself as a complex process of rethinking the role of educational institutions, their functions, value orientations, and mechanisms of interaction with the digital society.

Contemporary research shows that the integration of information and communication technologies (ICT) not only modifies the organisational forms of educational activity, but also determines new value orientations for the development of education, forming innovative models of pedagogical interaction and knowledge management. In global scientific discourse, the issue of digital transformation is mainly considered through the prism of technological modernisation and institutional adaptation of educational systems (Fernández et al., 2023). Some works focus on the impact of digitalisation on the quality of education and innovative processes in higher education institutions (Paños-Castro et al., 2024), while others emphasise the need to develop digital ethics and a new axiological environment (Zakryzhevskaya, 2024).

In recent years, studies have appeared that present an analysis of structural transformations in universities in the context of changes in their information architecture (Bobro, 2025), as well as works devoted to the challenges of digitalisation and the renovation of educational practices (Fazan et al., 2025). Research approaches are

increasingly focused on interpreting digitalisation as an element of innovative culture that ensures the evolutionary development of educational institutions.

Scholars also pay considerable attention to the analysis of models of digital transformation of the education, the strengths and weaknesses of modern digital structures (Vozniuk, 2025), and the prospects for their development (Kanevska et al., 2023). Scientific sources outline a trend towards the growing influence of ICT on the formation of new models of professional training, particularly in the field of innovative educational technologies and artificial intelligence (Nalyvaiko, 2023), and it is also noted that digitalisation contributes to the emergence of new formats of learning and institutional management (Vervoort et al., 2024).

The generalisation of processed materials gives grounds to conclude that the current stage of education development is characterised by the dynamic modification of institutional changes, where ICT plays the role of a catalyst for innovative processes. At the same time, the axiological dimension of digital transformation, which covers the humanistic, cognitive and cultural aspects of human interaction with digital technologies, remains insufficiently researched. That is why there is a need for a comprehensive scientific analysis of the functional role of ICT from the perspective of their impact on the value structure of education, the innovative behaviour of participants in the educational process and the formation of modern institutional models.

The relevance of the research is determined by the growing dependence of educational institutions on digital solutions, the need to understand the axiological consequences of technological modernisation, and the need to form a coherent conceptual framework for digital institutional dynamics. In modern conditions, ICTs are not only a means of optimising the educational process, but also an effective factor in innovative development, which determines the importance of a systematic analysis of their role in the transformation of the educational environment.

The **purpose** of the article is to investigate the modification dynamics of institutional changes in education and to conduct an axiological analysis of the role of information and communication technologies in this process.

METHODOLOGY

In order to study the scientific literature on the issue, we used a number of methods: analysis, synthesis, comparison, generalisation and systematisation. Their application ensured the processing of the latest scientific sources, the identification of key concepts of digital transformation, the clarification of the categorical and conceptual apparatus, and the reconstruction of conceptual models of ICT functioning in the structure of educational institutions. Content analysis of scientific publications in recent years has enabled us to identify current trends in global and national digitalisation and outline the problem area of the study.

The empirical part of the study was implemented through a survey aimed at identifying the characteristics of institutional transformations caused by ICT integration and analysing their axiological impact on participants in the educational process. Fifty teachers and higher education students from the V. G. Korolenko Poltava National Pedagogical University were involved in the survey, which ensured the relevance of the sample and the possibility of representative reproduction of the characteristics of the local educational environment.

The questionnaire contained eight content blocks aimed at researching: the level of digital transformation of the educational institution; institutional factors of digitalisation; the effectiveness of ICT uses formats; the impact of digital technologies on the quality of education; the transformation of value orientations; the humanistic content of pedagogical interaction; the level of innovative activity; the role of ICT in shaping an innovative culture. The survey method allowed us to obtain quantitative and qualitative data, which were analysed in detail. The combination of methods used ensured a comprehensive, interdisciplinary and valid nature of the study, which meets the requirements of modern scientific practice.

The empirical data we obtained during the study indicate that respondents have a predominantly positive perception of the functional role of ICT in modern educational processes. This way, 42% of respondents believe that digital technologies contribute to strengthening the humanistic potential of pedagogical interaction. About 30% of respondents emphasise the emergence of new forms of communication and interaction, which indicates a transformation of the traditional structure of educational communication. At the same time, 12% of participants note that the level of personal contact is decreasing which indicates the presence of certain barriers in the humanitarian dimension of digitalisation, associated with the risk of reducing interpersonal relationships and the emotional component of pedagogical interaction.

RESULTS

The concept of modification dynamics reflects not only evolutionary changes in the structure of educational institutions, but rather a systemic restructuring of the educational paradigm, in which the functional role of informational and communicative technologies becomes a determining factor in innovative development. Transformations in education are influenced by technological progress, which leads to new approaches to the organisation of the educational environment, teaching methodology, management of educational processes, and the formation of competencies required in the digital space (Kanevska et al., 2023).

It should be noted that the institutional dynamics of educational systems are determined, first and foremost, by the fact that digital technologies are not only a tool for modernisation, but also a catalyst for re-evaluating the axiological foundations of education. There is a shift towards a competence-based paradigm, where the main value is not the amount of knowledge acquired, but the ability to independently search for, critically comprehend and creatively interpret information (Kremen et al., 2022). Education is moving from a model of knowledge transfer to a model of co-creation of meaning, where ICTs are shaping new ways of communication, social interaction and cognitive activity.

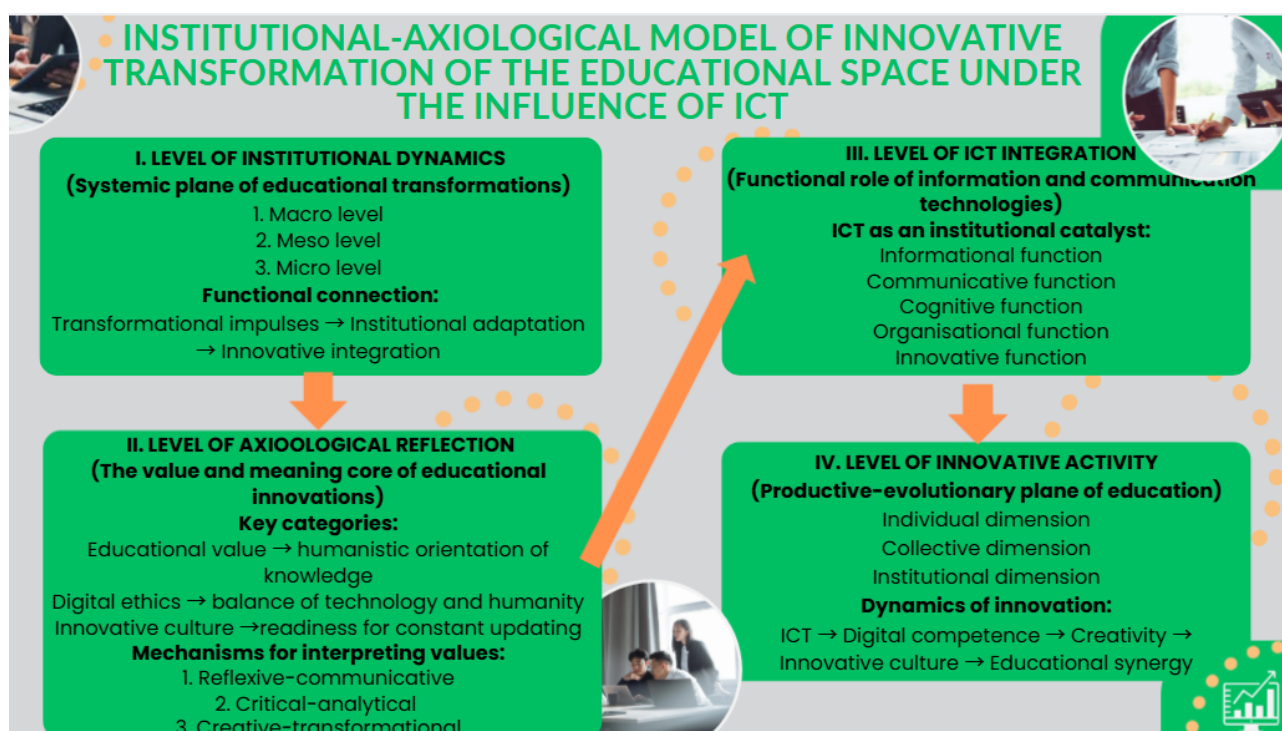
The axiological dimension of digital transformations lies in the fact that technologies not only change the form and content of the educational process, but also influence the value system of education as a social institution. The traditional model was dominated by the values of stability, discipline, authority and academic hierarchy. In the digital age, however, the values of openness, mobility, inclusiveness, partnership, self-development and innovation come to the fore. Thus, ICTs emerge as a factor of axiological renewal.

In the process of institutional change, mutual influence can be traced at three levels: technological, sociocultural, and value-semantic. At the technological level, this involves the introduction of digital platforms, learning management systems, distance learning courses, artificial intelligence in educational analytics, and the use of VR/AR technologies

for modelling educational situations. At the sociocultural level, it involves the transformation of the role of the teacher from a knowledge carrier to a facilitator of the educational process, and of the student from a passive consumer of information to an active participant in educational interaction (Voznyuk, 2025). At the value level, it involves the formation of new principles of ethical responsibility for the use of digital technologies, the preservation of academic integrity, and the development of digital culture. In the course of our research, we have developed an institutional-axiological model of innovative transformation of the educational space under the influence of ICT, which is structured on four levels (Figure 1).

Figure 1

Institutional-axiological model of innovative transformation of the educational space under the influence of ICT.



Source: developed by the authors

The institutional-axiological model of innovative transformation of the educational space under the influence of ICT considers the educational system as a multi-level dynamic structure that constantly adapts to the challenges of the digital age. At the level of institutional dynamics, which is the systemic plane of educational transformations, it is appropriate to identify three interrelated levels: macro, meso and micro.

The macro level reflects global and national trends in education development, which set the strategic direction for transformations. At this level, state education policy, digital education development strategies, concepts of digital competence, and national qualification frameworks are shaped. The latter define the goals, standards and benchmarks for innovative development.

The meso level covers the activities of educational institutions – universities, colleges, sectoral and regional educational structures. It is at this level that institutional strategies for digital development, the development of innovative educational programmes, and the introduction of digital platforms, services, and technologies for managing the educational process are formed. Universities are centres of innovative culture where new models of learning are formed (Buzhina et al., 2023).

Direct interaction between participants in the educational process in the digital environment of an educational institution is implemented at the micro level. It is characterised by the implementation of specific digital practices by teachers and students, the formation of a culture of using ICT in teaching, communication and research activities. This level is associated with the development of digital pedagogy, media literacy, digital ethics and critical thinking skills.

The functional link between levels reflects the dynamic logic of change: transformational impulses arising at the macro level (government initiatives, international standards, technological innovations) trigger a process of institutional adaptation at the meso level: educational institutions transform their structures, policies and practical implementation in line with new requirements (Bobro, 2025). The level of axiological reflection in our proposed model is the value-semantic basis of all educational innovations. It is at this level that the humanistic basis of digital transformations is formed, the essence of education in a technological society is rethought, and the new guidelines for educational development are defined.

The key concept is educational value, which sets the humanistic orientation of knowledge. Education is seen not only as a process of transferring information or developing competencies, but as a space for spiritual growth, self-realisation and the affirmation of universal human values. In this context, knowledge acquires axiological content: it is aimed at developing the individual, forming their responsibility, empathy and social thinking.

Another fundamental category is digital ethics, which ensures a balance between technology and humanity. On the one hand, digital technologies open up new opportunities for education – interactivity, accessibility, individualisation of learning; on the other hand, they create risks of depersonalisation, loss of meaning in interaction, and information overload (Vervoort et al., 2024; Zakryzhevskaya & Ovod, 2024).

The third value orientation is an innovative culture that expresses the educational community's readiness for continuous renewal, creative thinking, and openness to change. This is not only the ability to implement new technologies, but also the ability to critically assess their impact and integrate innovations taking into account pedagogical expediency and value content (Danylevskiy, 2024). Three interrelated mechanisms of value interpretation operate to form the axiological level of innovative thinking: reflective-communicative, critical-analytical, and creative-transformational.

The reflexive-communicative mechanism ensures dialogue between cultures and creates space for mutual understanding between participants in the educational process. It involves the development of communicative competence, tolerance, and respect for opponents. It is through dialogue that educational autonomy is formed – the ability of an individual to independently determine their own value orientations in the process of cognition (Shenkoya & Kim, 2023).

The critical-analytical mechanism associated with rethinking value priorities under the influence of ICT deserves special attention. Its core lies in developing the ability to critically evaluate not only information, but also one's own values, motivations, and attitudes. This mechanism also helps to resist manipulation and information overload, and develops skills of value self-identification in the digital space.

The creative-transformational mechanism expresses the highest level of axiological reflection, as it involves not only the awareness of existing values, but also the creation of

new meanings, norms and cultural codes of digital education. This mechanism activates innovative thinking aimed at constructing future models of educational interaction.

The level of ICT integration in modern education demonstrates a qualitatively new dynamic of institutional transformations covering the structure, content and methods of organizing the educational process. Informational and communicative technologies are gradually moving from being auxiliary tools to becoming a system-forming factor that determines the logic of the development of the digital educational ecosystem and provides new formats for interaction between participants in the educational environment (Fernández et al., 2023).

First and foremost, ICTs perform a key informational function, which consists in creating digitally structured knowledge arrays and ensuring their accessibility, mobility and interactivity. Thanks to digital libraries, cloud storage and educational platforms, there is a transition from linear models of information presentation to networked, multimodal and dynamically updated educational resources (Nalyvaiko, 2023).

An equally important component of digital technology integration is the communication function, which enables the creation and maintenance of online educational communities where collective forms of learning, interdisciplinary dialogue and joint projects can be implemented. ICT also has a significant impact on the cognitive sphere, as it implements a cognitive function aimed at developing digital literacy, critical thinking skills, analytical skills, and the ability to work with large amounts of information (Fazan et al., 2025). In addition, the organisational function is equally important, covering the digitisation of management and administrative procedures, the automation of educational processes, and the introduction of systems for monitoring and analysing learning outcomes (Polinkevych & Kuzmak, 2023). The comprehensive impact of ICT is clearly expressed through its innovative function, which determines the ability of educational systems to form and maintain digital ecosystems of varying levels of complexity. These include interactive platforms, intelligent educational systems, virtual laboratories, simulation environments, and artificial intelligence tools that personalise the learning process and increase its adaptability (Jackson & Jackson, 2024; Kostikova et al., 2024; Gulich., & Chetveryk, 2025).

In the current context of digital transformation in education, the level of innovation activity is defined as an influential indicator of the productive and evolutionary potential of the educational environment. Its structure encompasses three interrelated dimensions: individual, collective and institutional. Each of these dimensions shapes specific mechanisms for the production, reproduction and dissemination of innovative practices.

At the individual level, innovative activity manifests itself primarily through the formation of digital competence, which is a basic condition for the effective use of information and communication technologies in professional activities. This dimension includes the ability to critically evaluate digital resources, master technological tools, and skills for safe work in the information space (Nychkalo et al., 2025). The collective level emerges as a dynamic space for interaction, within which professional communities, interdisciplinary teams, and digital platforms form a new culture of joint intellectual creation (Fedorchuk, 2024). At the institutional level, innovative activity takes on a strategic dimension and is implemented through the activities of innovation laboratories, technology transfer centres, digital campuses, and educational innovation hubs (Liannoi et al., 2024).

It should be noted that the dynamics of innovation in education are characterised by a certain sequence: ICT → digital competence → creativity → innovative culture →

educational synergy. Informational and communicative technologies trigger development mechanisms, thereby forming new ways of cognition and creative interaction. Digital competence creates the basis for creativity as the ability to generate new ideas, design them and implement them in educational practice.

Creativity, in turn, transforms into an innovative culture that integrates the value, communicative and organisational aspects of modernising education. The end result of the outlined directions is educational synergy – a state of coordinated development of all levels of the educational system, in which innovations become not separate elements, but a systemic characteristic of institutional dynamics (Mihai et al., 2025).

As part of the proposed study, we developed a questionnaire and surveyed 50 teachers and students of higher education at the V.G. Korolenko Poltava National Pedagogical University. The survey was conducted to identify the characteristics of institutional changes caused by digitalisation and to analyse the impact of ICT on the transformation of the value, cognitive and activity components of the educational process (Figure 2).

Figure 2

Survey participant questionnaire

SURVEY PARTICIPANT QUESTIONNAIRE

- How would you rate the level of digital transformation of the educational environment at your educational institution?
A. High B. Sufficient
C. Moderate D. Low
- Which of the following factors do you think is decisive in the process of digital transformation of education?
A. Technological development of society
B. State education policy
C. Labour market requirements
D. External global challenges
- Which format of using information and communication technologies is the most effective in ensuring the educational process?
A. Online courses and distance learning platforms
B. Blended learning
C. Virtual laboratories, simulations
D. Interactive electronic resources
- To what extent, in your opinion, do ICTs contribute to improving the quality of educational outcomes?
A. To a significant extent
B. Partially C. Minimally
D. Not at all
- Which of the following values do you think is a priority in the digital educational space?
A. Openness and accessibility of knowledge
B. Individualisation of learning
C. Academic integrity
D. Creative self-realisation
- How has the introduction of ICT affected the value system of modern education?
A. It has contributed to the formation of new humanistic values
B. It has changed the balance between traditional and modern values
C. It has led to a reassessment of the roles of teachers and students
D. It has had virtually no impact
- Do you think that the digitisation of education changes the humanistic content of pedagogical interaction?
A. Yes, it expands the humanistic possibilities of education
B. Partially, it creates new forms of interaction
C. No, it reduces the level of personal contact
D. It is difficult to determine
- To what extent, in your opinion, does the use of ICT stimulate innovative activity among students?
A. To a significant extent
B. To a moderate extent
C. To a minor extent
D. It does not stimulate it at all

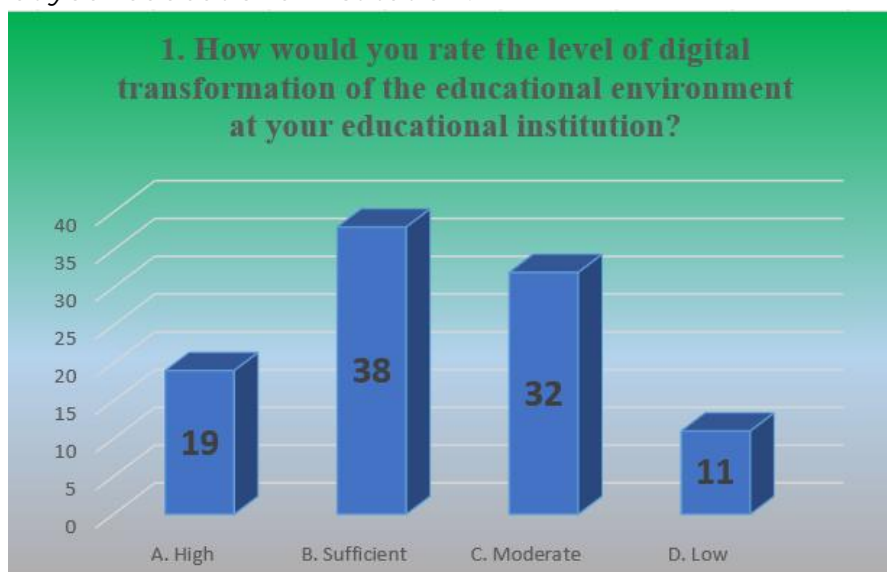
Source: developed by the authors

The survey results show that teachers and higher education students have clear guidelines regarding digital transformation processes and their axiological basis. The majority of respondents assess the level of digitalisation as sufficient (38%) and moderate (32%).

Only 19% of respondents consider the level of transformation to be high, and 11% consider it to be low. The configuration of responses indicates that digitalisation is perceived as an irreversible and already institutionalised process. However, the problem of uneven material and technical support remains one of the key challenges (Figure 3).

Figure 3

Question 1. How would you rate the level of digital transformation of the educational environment at your educational institution?

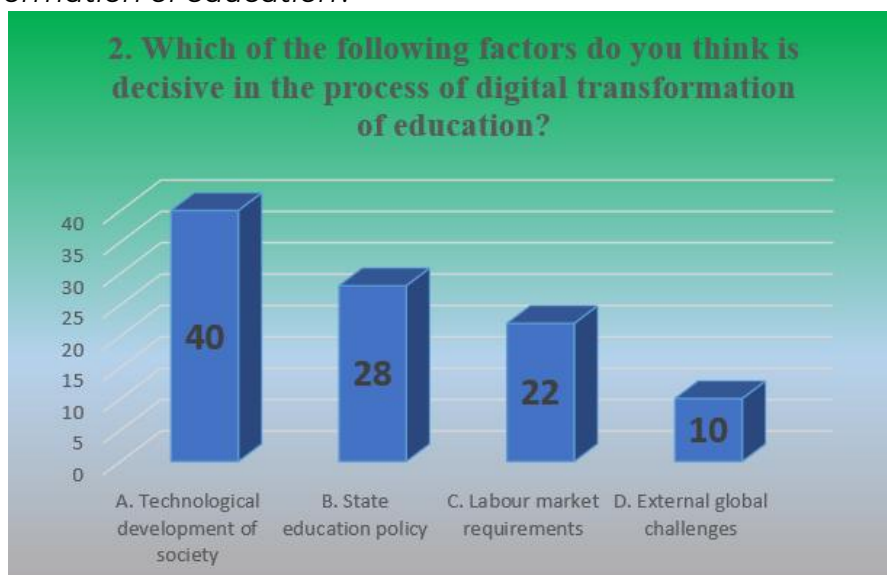


Source: developed by the authors

Technological development of society (40%) and state education policy (28%) were identified by respondents as the most significant factors of change. At the same time, labour market demands (22%) and global challenges (10%) play a secondary role, although their strategic impact on the formation of educational trajectories is obvious. The dominance of the technological factor confirms the direct dependence of educational transformations on the external environment rather than on the internal initiative of institutions (Figure 4).

Figure 4

Question 2. Which of the following factors do you think is decisive in the process of digital transformation of education?



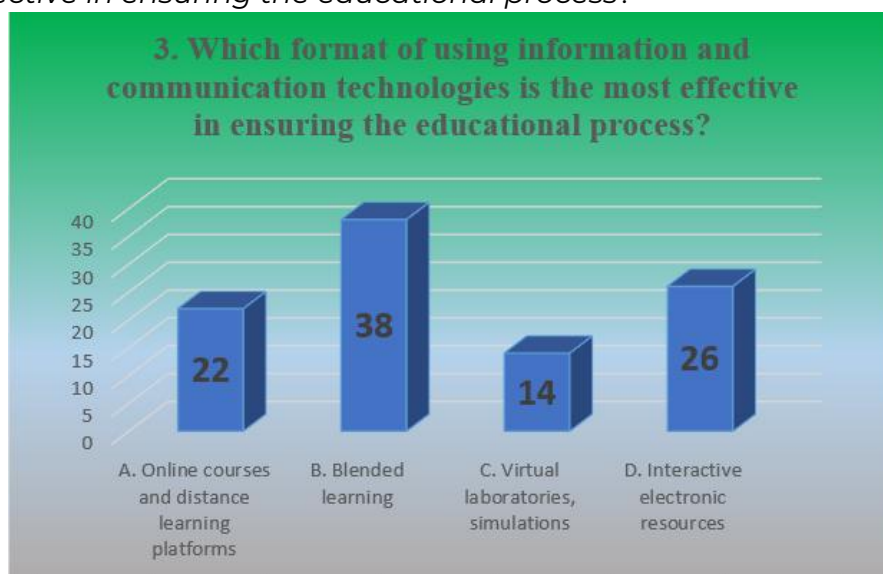
Source: developed by the authors

According to respondents, blended learning (38%) and interactive electronic resources (26%) are the most effective. Online courses (22%) and virtual laboratories (14%) are less popular. A summary of the data obtained allows us to conclude that respondents currently consider comprehensive, integrative models of digital interaction that

preserve pedagogical logic while expanding the technological toolkit to be the most effective (Figure 5).

Figure 5

Question 3. Which format of using information and communication technologies is the most effective in ensuring the educational process?

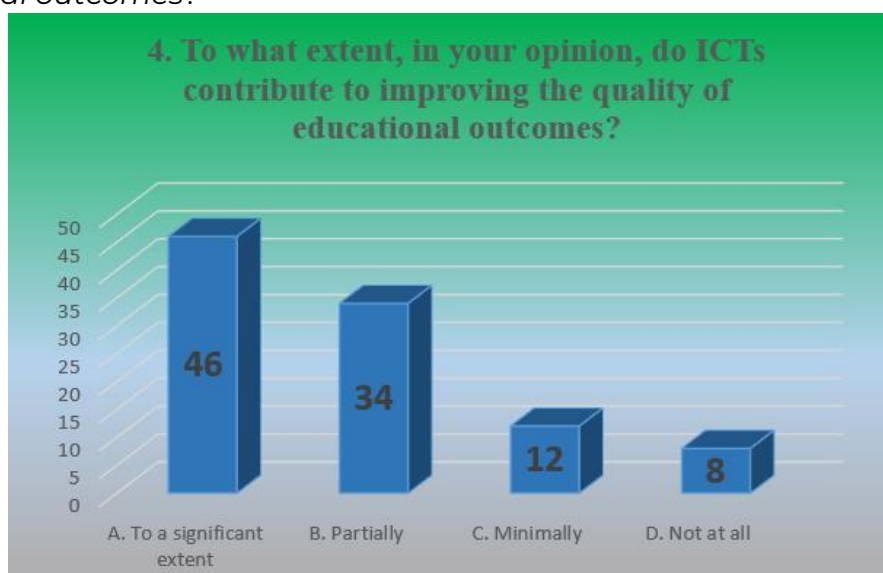


Source: developed by the authors

Respondents most often indicated that ICT significantly (46%) or partially (34%) improves the quality of results. The results indicate a positive correlation between digital technologies and learning effectiveness. Only 12% and 8% indicate a weak or no impact, which can be attributed to an individual pedagogical style or low levels of digital competence (Figure 6).

Figure 6

Question 4. To what extent, in your opinion, do ICTs contribute to improving the quality of educational outcomes?



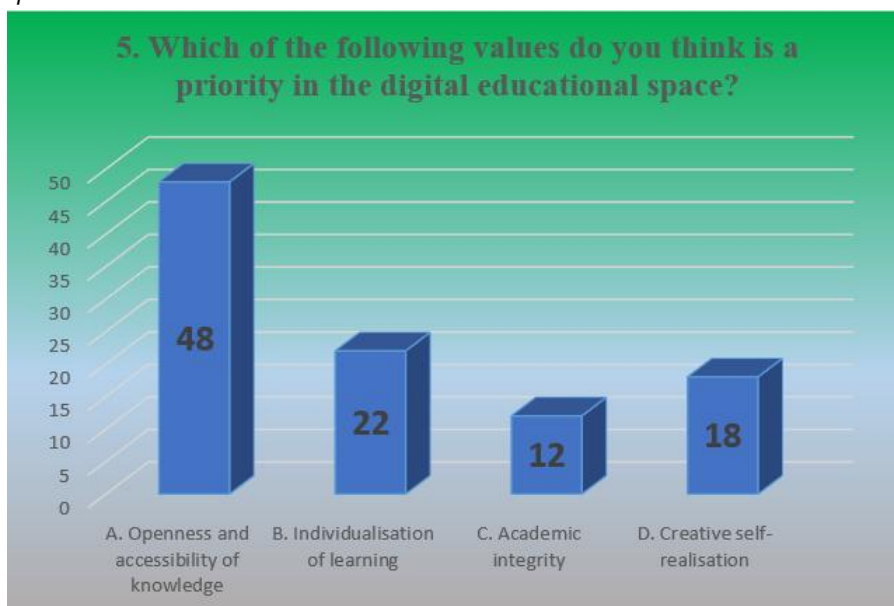
Source: developed by the authors

At the same time, respondents noted openness and accessibility of knowledge as a priority value (48%), which is consistent with global development trends. Individualisation of learning was chosen by 22%, confirming the shift in focus towards personalised educational trajectories. Academic integrity was chosen by 12%, reflecting the relevance of ethical components in the digital space. Creative self-realisation was supported by 18% of

respondents. The results of the study allow us to conclude that digitalisation is not only a technological factor but also a tool for shaping a new system of educational values (Figure 7).

Figure 7

Question 5. Which of the following values do you think is a priority in the digital educational space?

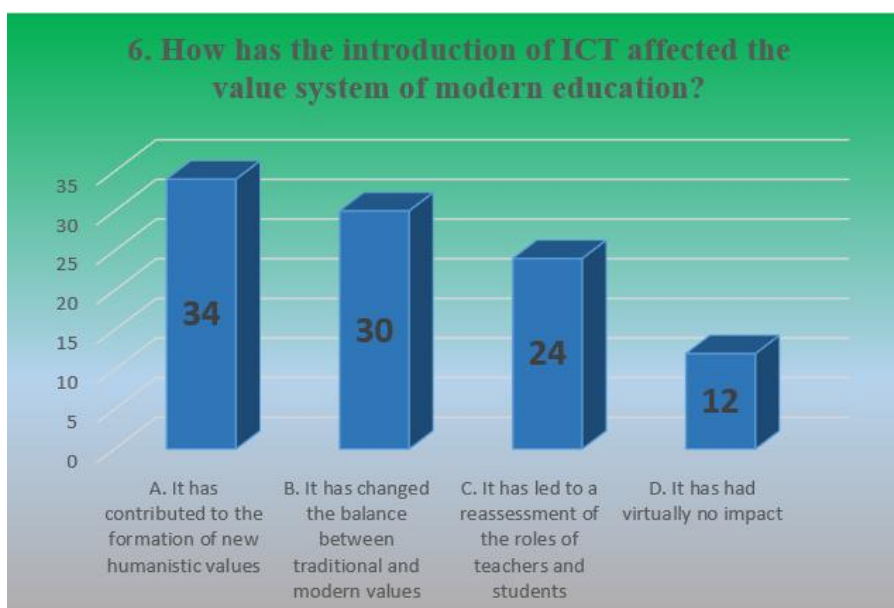


Source: developed by the authors

Further analysis of the responses shows that 34% of respondents see digitalisation as a factor in the formation of new humanistic orientations, 30% note a change in the balance between traditional and modern values, and 24% note a reassessment of the roles of teachers and students. Only 12% do not feel that digital changes have a significant impact on the value structure of education. The data obtained confirm that ICTs cause profound axiological shifts that affect models of pedagogical interaction, the nature of communication, and new forms of academic responsibility (Figure 8).

Figure 8

Question 6. How has the introduction of ICT affected the value system of modern education?

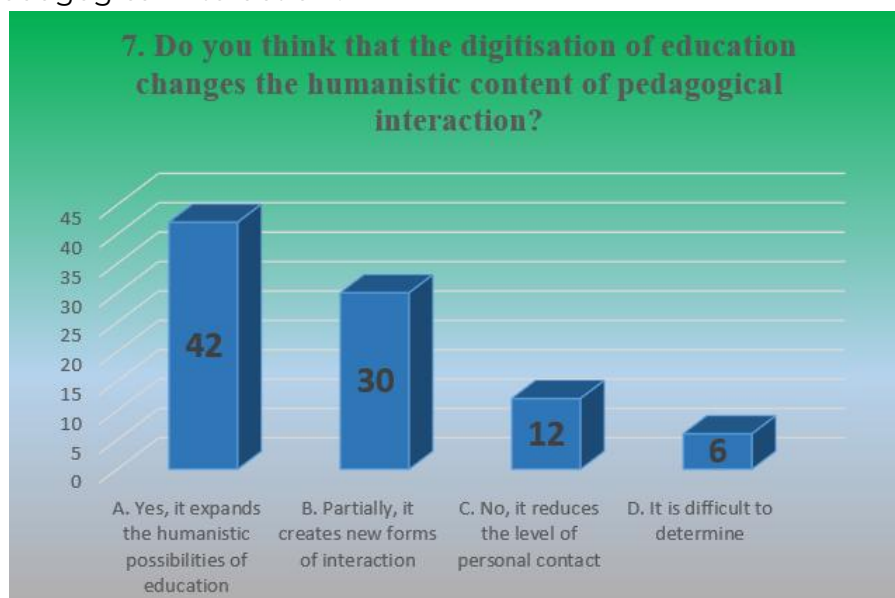


Source: developed by the authors

42% of respondents believe that ICT expands the humanistic potential of pedagogical interaction, while 30% point to the emergence of new forms of interaction. At the same time, 12% note a decrease in the level of personal contact, and 6% find it difficult to determine. The survey results show that digitalisation is largely seen as a tool for the development of humanistic education, but requires further pedagogical consideration (Figure 9).

Figure 9

Question 7. Do you think that the digitisation of education changes the humanistic content of pedagogical interaction?

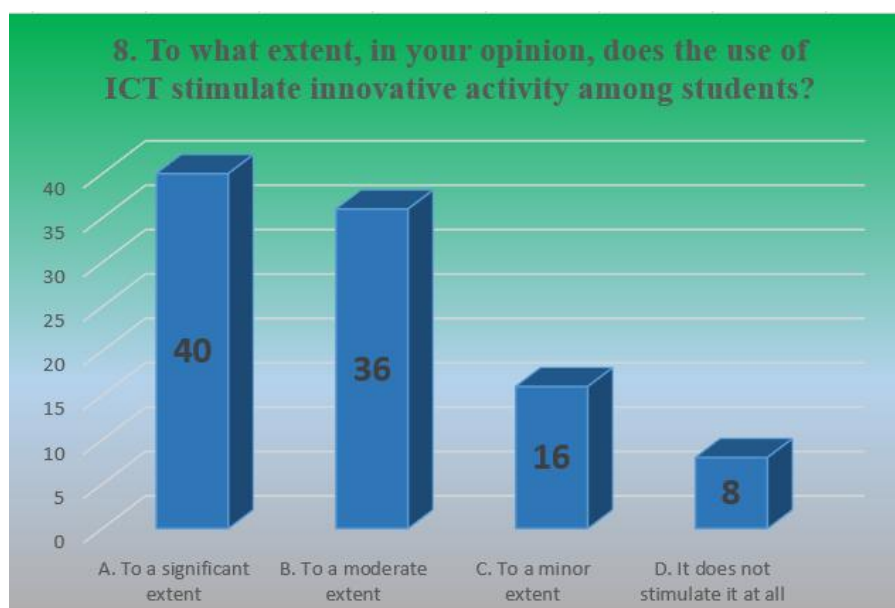


Source: developed by the authors

According to respondents, ICT stimulates innovative activity to a significant (40%) or moderate (36%) extent, which indicates a direct dependence between digital tools and applicants' readiness for creative exploration. Only 16% and 8% assess this impact as insignificant or non-existent (Figure 10).

Figure 10

Question 8. To what extent, in your opinion, does the use of ICT stimulate innovative activity among students?



Source: developed by the authors

A summary of the obtained results allows us to conclude the following: the digital transformation of education at the present stage is systemic in nature, concerns infrastructural, organisational and axiological aspects, contributes to the revision of traditional educational models and opens up prospects for the formation of a new innovative and humanistic culture. The survey results show that ICT plays a role not only as a technological tool, but also as a vehicle for meaningful, ethical and cultural changes that will determine the trajectory of education development in the near future.

DISCUSSION

The results of the study confirm the provisions of modern scientific concepts, according to which the digitisation of higher education appears as a multidimensional institutional process that encompasses not only the introduction of information and communication technologies, but also the structural transformation of educational practices, management mechanisms and value orientations. The work of N. Bobro (2025), which focuses on changing the information architecture of universities as the basis for forming an innovation-oriented educational environment, is of scientific value. The empirical data obtained correlate with these approaches, confirming the trend towards institutional rethinking of educational activities in the context of digital transformation.

At the same time, the results of the study reveal a number of problematic aspects that form the field of scientific discussion on the consequences of the active use of ICT in higher education. The scientific research of I. Buzhina, M. Imeridze and O. Kuzmenko (2023) emphasises the ambivalence of innovative technologies, which, along with expanding didactic opportunities, can cause an increase in cognitive load and formalisation of educational interaction. These provisions are specified in the works of D. Danilevsky (2024) and V. Fazan with co-authors (2025), which focus on the neurophysiological and communicative challenges of distance and blended learning. The trend towards a decrease in the intensity of direct pedagogical contact identified in the study is consistent with the conclusions of O. Polinkevich and O. Kuzmak (2023) regarding the quality of distance education in the Ukrainian context, which allows us to consider digitalisation as a process with internally contradictory dynamics.

Within the axiological approach, the digital transformation of education is understood as a process whose effectiveness is determined not only by the level of technological equipment, but above all by the ability of educational institutions to integrate innovations into the humanistic paradigm of development. The works of V. G. Kremniy, L. M. Grynevych, V. I. Lugovoy, and Zh. V. Talanova (2022) emphasise the need to align digital changes with the tasks of ensuring the quality of education and innovation-oriented social development. At the same time, the research of I. Zakryzhevskaya and L. Ovod (2024) highlights the problem of forming digital ethics and academic integrity as key regulators of educational activity in a digital environment. This way, the results of the study allow us to conclude that the modification dynamics of institutional changes in higher education should be considered as a holistic process within which technological innovations interact with value-normative regulators of educational practice.

CONCLUSIONS

Analysis of the materials we have studied allows us to conclude that digital transformation initiates modifications in the institutional structure of education, covering both functional and axiological components. Informational and communicative technologies act as a catalyst for change, ensuring: the expansion of the information capabilities of the educational environment; the formation of new

communication models; the increase of cognitive autonomy and digital competence of participants in the educational process; the innovative renewal of professional activity; the reorientation of the value priorities of education in accordance with the requirements of digital culture. This way, ICT acts not only as a technological tool, but also as an institutional and axiological factor that determines the vector of development of modern education and forms a new paradigm for the development of innovations.

At the same time, the empirical data we obtained during the study indicate that respondents have a predominantly positive perception of the functional role of ICT in modern educational processes. This way, 42% of respondents believe that digital technologies contribute to strengthening the humanistic potential of pedagogical interaction. About 30% of respondents emphasise the emergence of new forms of communication and interaction, which indicates a transformation of the traditional structure of educational communication. At the same time, 12% of participants note that the level of personal contact is decreasing which indicates the presence of certain barriers in the humanitarian dimension of digitalisation, associated with the risk of reducing interpersonal relationships and the emotional component of pedagogical interaction.

Overall, the survey results show that ICT is seen by most respondents as a factor in the humanisation and modernisation of the educational process, but at the same time reveal the need for further optimisation of pedagogical practices aimed at combining digital and traditional forms of interaction. This confirms the position on the modification dynamics of institutional changes, within which digitalisation acts as a resource for innovative activity, but requires balanced consideration of its axiological consequences.

We believe that the development of analytical approaches to measuring innovation activity in education is a promising direction. In particular, it is advisable to develop comprehensive indicators (metrics of digital competence, creativity, innovative productivity, cognitive dynamics) that will allow for comparative analysis between educational institutions of different levels and types.

CONFLICT OF INTERESTS

The authors declare that there are no conflicts of interest regarding the publication of this paper.

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ARTIFICIAL INTELLIGENCE STATEMENT

No artificial intelligence tools were used in the preparation of this manuscript.

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UNIVERSITY TEACHER CREATIVITY IN THE PARADIGM OF DIGITAL TRANSFORMATION IN EDUCATION

КРЕАТИВНІСТЬ ВИКЛАДАЧА В ПАРАДИГМІ ЦИФРОВОЇ ТРАНСФОРМАЦІЇ ОСВІТИ

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ABSTRACT

Purpose. The purpose of the article is to substantiate theoretically the role of university teacher creativity in the paradigm of digital transformation of education and to identify the main directions of its manifestation in the modern education.

Methodology. The methodological basis of the study is a comprehensive scientific and theoretical approach that combines the ideas of humanistic pedagogy, creativity theory, and competence-based and innovative approaches in education. In the work the methods of analysis, synthesis, generalisation and systematisation of scientific sources on the issues of teacher creativity, digital transformation of education and modern pedagogical practices were used. That made it possible to clarify the meaning of the concept 'university teacher creativity,' identify its structural components, and substantiate the role of a university teacher's creative potential as a key factor in improving the quality of education in the context of digital change. The use of qualitative analysis ensured the interpretation of changes in the professional activities of university teachers and allowed us to formulate results, conclusions about the importance of creativity as a strategic resource for the education modernisation.

Result. As part of the research, the author-developed programme was designed for developing university teachers' creativity, aimed at forming creative thinking, an innovative style of pedagogical activity, and readiness for professional transformations in the context of education digitalisation. The university programme consists of eight thematic lessons that combine elements of communication practices, reflection, and educational design. Its content is focused on developing flexibility of thinking, improvisational skills, innovative methods, pedagogical expressiveness, and the ability to self-reflect.

The particular attention is focused on reflective practices, which will allow university teachers to become aware of their own creative identity and professional changes. Due to this, university programme participants will be able to form individual trajectories of creative development, determine directions for further self-improvement, and define their own role as agents of innovation in educational environment.

Conclusions. The study confirmed that university teacher creativity is an important factor in improving the quality of higher education in the context of digital

Мета. Метою статті є теоретичне обґрунтування ролі креативності викладача в парадигмі цифрової трансформації освіти та визначення основних напрямів її прояву в сучасному освітньому процесі.

Методологія. Методологічну основу дослідження становить комплексний науково-теоретичний підхід, що поєднує ідеї гуманістичної педагогіки, теорії творчості, компетентнісного та інноваційного підходів в освіті. У процесі роботи було використано методи аналізу, синтезу, узагальнення та систематизації наукових джерел з проблематики креативності викладача, цифрової трансформації освіти та сучасних педагогічних практик. Це дозволило уточнити зміст поняття «креативність викладача», визначити її структурні компоненти та обґрунтувати роль творчого потенціалу педагога як ключового чинника підвищення якості освітнього процесу в умовах цифрових змін. Застосування якісного аналізу забезпечило інтерпретацію змін у професійній діяльності викладачів та дозволило сформулювати висновки щодо значущості креативності як стратегічного ресурсу модернізації освіти.

Результати. У межах дослідження було розроблено авторську програму розвитку креативності викладачів, спрямовану на формування творчого мислення, інноваційного стилю педагогічної діяльності та готовності до професійних трансформацій в умовах цифровізації освіти. Програма містить вісім тематичних занять, які поєднують елементи комунікативних практик, рефлексії та освітнього проектування. Її зміст орієнтований на розвиток гнучкості мислення, імпрровізаційних умінь, інноваційності методів, педагогічної виразності та здатності до саморефлексії.

Особлива увага приділена рефлексивним практикам, що дозволяє усвідомити викладачам власну творчу ідентичність та професійні зміни. Завдяки цьому учасники програми можуть сформувати індивідуальні траєкторії креативного розвитку, визначити напрями подальшого самовдосконалення та окреслити власну роль як агентів інновацій в освітньому середовищі.

Висновки. Проведене дослідження підтвердило, що креативність викладача є вагомим чинником підвищення якості освіти в умовах цифрової трансформації. Вона

transformation. It enables university teachers to respond flexibly to the challenges of the modern educational environment, introduce innovative teaching methods, create a motivational learning surrounding, and develop 21st-century competencies for students.

An analysis of scientific sources has allowed us to define creativity as an integrative professional and personal characteristic that combines flexibility of thinking, improvisation, critical thinking, innovation, imagination, risk-taking, and the ability to reflect. It is the interaction of these components that ensures effective pedagogical activity in the modern educational environment.

Thus, the development of university teacher creativity should be considered a strategic direction for education modernisation, contributing to the development of an innovative culture, improving the quality of education, and training competitive specialists for modern society.

Keywords: *creative pedagogical thinking, digital educational environment, digital pedagogy, development of creative potential, educational innovations, educational system, innovative pedagogical activity, professional self-realisation of university teachers.*

забезпечує здатність педагога гнучко реагувати на виклики сучасного освітнього середовища, впроваджувати інноваційні методи навчання, створювати мотиваційно насичений навчальний простір і формувати в здобувачів освіти компетентності XXI століття.

Аналіз наукових джерел дозволив визначити креативність як інтегративну професійно-особистісну характеристику, що поєднує гнучкість мислення, імпрровізацію, критичне мислення, інноваційність, уяву, готовність до ризику та здатність до рефлексії. Саме взаємодія означених компонентів забезпечує ефективну педагогічну діяльність у сучасному освітньому просторі.

Таким чином, розвиток креативності викладача слід розглядати як стратегічний напрям модернізації освіти, що сприяє формуванню інноваційної культури, підвищенню якості навчального процесу та підготовці конкурентоспроможних фахівців для сучасного суспільства.

Ключові слова: *креативне педагогічне мислення, цифрове освітнє середовище, цифрова педагогіка, розвиток креативного потенціалу, освітні інновації, освітня система, інноваційна педагогічна діяльність, професійна самореалізація викладачів.*

INTRODUCTION

In the context of rapid digital transformation, modern education is undergoing profound structural and methodological changes. The integration of digital technologies, artificial intelligence tools and innovative pedagogical approaches is significantly changing the role of university teachers in the educational process (Fazan et al., 2025). Today, university teachers act not only as knowledge carriers, but also as learning facilitators, educational environment designers, and initiators of creative change. In this context, university teacher's creativity is becoming particularly important as a factor in improving the quality of higher education, the adaptability of the learning process, and the formation of 21st-century competencies.

Contemporary scientific research shows that digital creativity and professional digital competence are integral components of teacher training. In particular, Batuchina and Melnikova (2025) emphasise the importance of developing the creative potential of teachers in a digital educational environment, while Nagel and Amdam (2025) highlight the role of professional digital competence in supporting innovative teaching practices. Research by Gilian-Gamés, Ruiz-Palmeró and Gómez-García (2024) shows that creativity is a key predictor of successful training for future teachers in the digital age. This indicates that creativity is no longer just an individual trait but is transforming into a strategic professional resource.

The usage of artificial intelligence tools in education further highlights the need to develop creative pedagogical thinking (Gulich, & Chetveryk, 2025). As E. Jackson and H. Jackson (2024) note, digital technologies can enhance human educational opportunities

only if they are used creatively, critically, and pedagogically appropriately. In this regard, the teacher's ability to improvise pedagogically, design innovative courses and create an interactive educational environment is of particular importance.

Ukrainian scientists also emphasise the need to develop creative thinking for students and teachers. Research by Babak and Vorozhbit-Gorbatyuk (2021), Vovchasta, Bairamova and Chorna (2022), and Chuzhikova (2022) demonstrates the importance of developing a creative personality as the basis for professional development. At the same time, Paska, Moiseienko and Shapka (2024) emphasise the importance of innovative approaches to teacher training for the implementation of modern educational technologies and the stimulation of creativity in students.

Despite the growing number of studies, the problem of the systematic development of teacher's creativity in the context of the digital transformation of education remains underdeveloped. Particular attention should be paid to the creation of original professional development programmes aimed at forming the creative identity of teachers, developing communication skills, flexibility of thinking and readiness for innovation.

The **purpose** of the article is to substantiate theoretically the role of university teacher creativity in the paradigm of digital transformation of education and to identify the main directions of its manifestation in the modern education.

METHODOLOGY

The methodological basis of the study is a comprehensive scientific and theoretical approach that integrates the principles of humanistic pedagogy, creativity theory, and competency-based and innovative approaches in modern education. This methodological framework provides a holistic view of the problem of teacher creativity development in the context of the digital transformation of the educational environment and allows us to consider it as a multidimensional phenomenon that combines personal, professional, and technological aspects of pedagogical activity.

The research used general scientific methods of analysis, synthesis, generalisation and systematisation of scientific sources devoted to the problems of development teacher's creativity, the introduction of digital technologies in education and the transformation of modern pedagogical practices. The application of these methods made it possible to clarify the content and essential characteristics of the concept of 'teacher creativity', identify its key structural components, and trace their interconnection in the professional activity of teachers.

The study pays particular attention to a qualitative analysis of the changes taking place in the professional activities of teachers under the influence of the digitalisation of the educational process. This made it possible to interpret creativity not only as an individual personality trait, but also as a strategic resource for the modernisation of education, contributing to the improvement of the quality of teaching, the adaptability of educational programmes and the effectiveness of pedagogical interaction in the context of dynamic socio-cultural and technological changes.

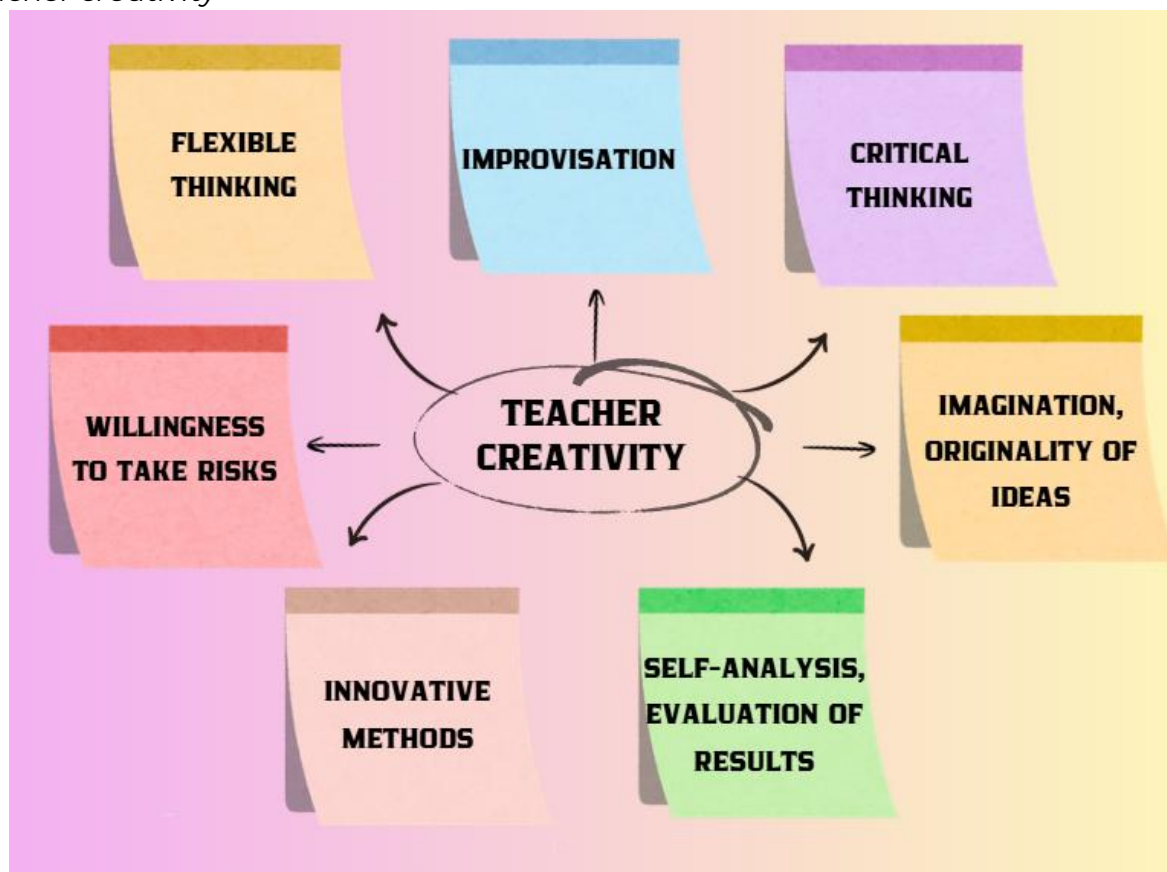
RESULTS

In pedagogical science, the concept of 'creativity' is considered to be an individual's ability to generate original ideas, non-standard solutions and innovative approaches in their professional activities. In the context of teaching practice, creativity is associated

with the ability to modify traditional teaching methods, adapt the educational process to the individual needs of learners, and use modern technologies to enhance the effectiveness of learning (Pavliukh, 2023). Pedagogical creativity includes the following components (Figure 1).

Figure 1

Teacher creativity



This scheme shows that teacher's creativity is a multidimensional phenomenon that combines intellectual, personal, emotional-volitional, and professional characteristics. It enables teachers to develop original educational solutions, adapt to change, use digital technologies effectively, and create an innovative educational environment. The structure of teacher creativity encompasses a number of interrelated components, each of which plays an important role in professional activity.

Flexibility of thinking plays an important role, manifested in the teacher's ability to quickly change teaching strategies depending on the situation, the educational needs of students, and the context of the learning process. It involves the ability to switch from standard to non-standard methods, combine different pedagogical approaches, and adapt teaching materials to different levels of student preparation (Guillén-Gámez et al., 2024). Flexible thinking allows teachers to respond effectively to the challenges of digital transformation, integrate new technologies, and create individualised educational trajectories.

Special attention should be paid to improvisation as the ability of a teacher to respond quickly to unpredictable situations in the educational process. It is manifested in the ability to change the course of a lesson, select alternative examples, formulate new questions, and use spontaneous ideas to increase student motivation. Improvisational

skills contribute to the creation of a lively, dynamic learning environment in which the teacher acts not only as a bearer of knowledge but also as a partner in creative learning.

Critical thinking provides the teacher with the ability to analyse pedagogical situations, evaluate the effectiveness of teaching methods and make informed professional decisions. It includes the ability to ask questions, verify the accuracy of information, identify logical contradictions, and form reasoned conclusions (Chuzhykova, 2022). In the context of digital education, critical thinking helps educators consciously select digital resources, evaluate their pedagogical relevance, and ensure the quality of educational content.

We should not forget about imagination, which is a source of creative solutions and non-standard approaches to teaching. It enables teachers to create creative lesson plans, develop original methodologies, and integrate elements of games, art, and digital technologies into the learning process. Original ideas contribute to the formation of a unique teaching style and increase students' interest in learning. Thanks to their developed imagination, teachers are able to transform educational material into an exciting and meaningful learning experience.

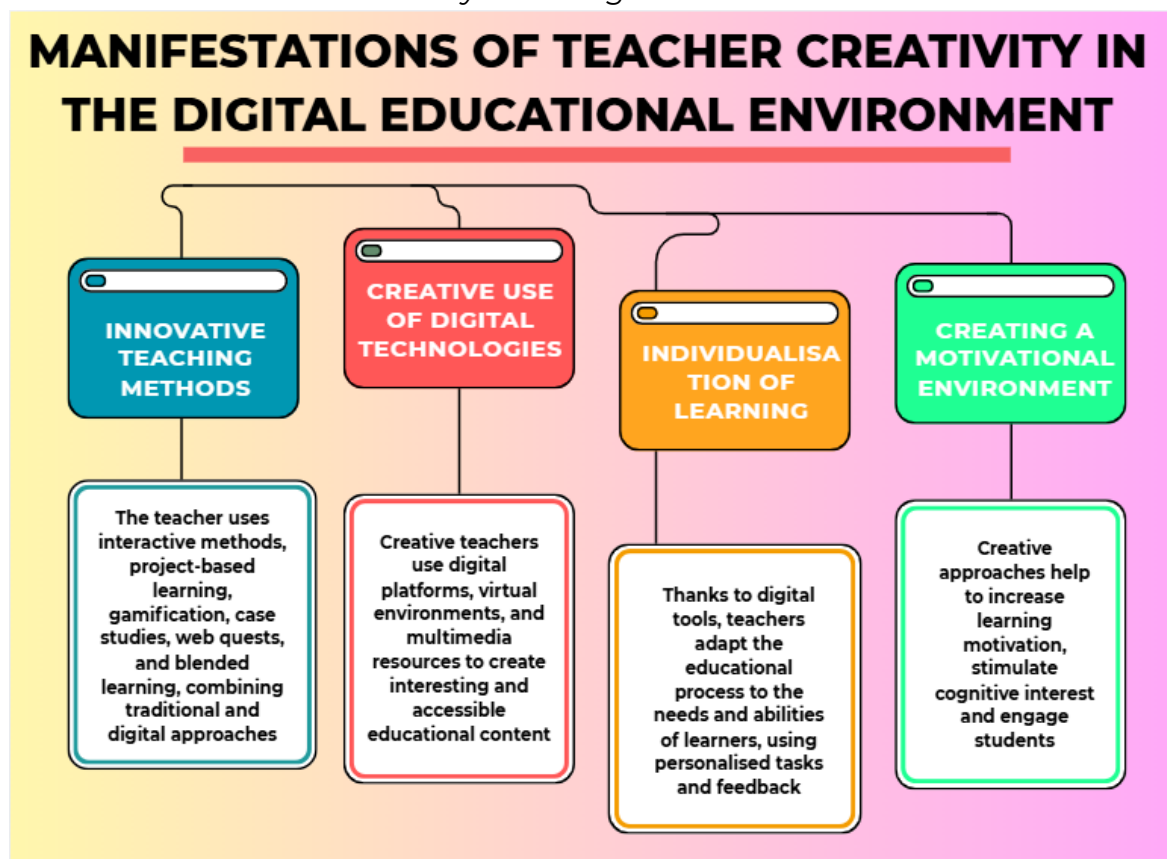
At the same time, the ability to reflect is an important component of a teacher's creativity. Self-analysis involves awareness of one's own pedagogical actions, evaluation of learning outcomes, and identification of strengths and weaknesses in professional practice. A reflective approach contributes to continuous professional growth, improvement of teaching methods, and enhancement of the quality of the educational process. A teacher who analyses their own experience is capable of generating new ideas and implementing innovations (Kolesnyk et al., 2023).

The innovativeness of methods lies in the use of modern pedagogical technologies, interactive forms of learning and digital tools. Creative teachers actively use online platforms, virtual environments, multimedia resources, and blended learning formats. An innovative approach contributes to increasing student motivation, developing their competencies, and forming 21st-century skills.

It is important to emphasise the importance of a teacher's willingness to take risks, which involves the courage to experiment with new methods, go beyond traditional pedagogical models and implement non-standard educational solutions. Creative teachers are not afraid of mistakes, as they see them as a resource for professional growth. This attitude contributes to the development of an innovative culture in the educational environment and the formation of openness to change.

The digital transformation of education involves the integration of digital technologies into all components of the educational process: content, forms, methods and means of teaching. It encompasses the use of electronic educational platforms, online courses, virtual laboratories, artificial intelligence, mobile applications and other digital tools (Ulmasovna et al., 2022). Within the new educational paradigm, the teacher ceases to be merely a source of knowledge and takes on the role of facilitator, mentor, and moderator of the learning process (Paska et al., 2024).

This requires a high level of digital competence, pedagogical flexibility, and creativity. The digital educational environment opens up wide opportunities for a creative approach to teaching, but at the same time requires teachers to be able to quickly adapt to new technological conditions (Shpak, 2023). Teachers' creativity in the context of the digital transformation of education manifests itself in various aspects of their professional activity (Figure 2).

Figure 2*Manifestations of teacher creativity in the digital educational environment*

The innovative pedagogical activity of modern teachers in the context of the digital transformation of education is based on the widespread use of creative and interactive teaching methods. In their professional practice, teachers combine traditional pedagogical approaches with project-based learning, gamification, case studies, webquests, and blended learning models, which promotes the active involvement of students in the learning process and the development of their critical and creative thinking (Nagel & Amdam, 2025). This combination of methods allows for the creation of learning situations focused on solving real professional tasks and the formation of practically significant competencies.

An important component of creative pedagogical activity is the creative use of digital technologies. Teachers use digital educational platforms, virtual learning environments, multimedia and interactive resources to construct meaningful, visually appealing and accessible educational content. This ensures a variety of forms of presentation of educational material, increases its clarity and contributes to better assimilation of knowledge in the digital educational space.

The use of digital tools also opens up opportunities for individualised learning. Creative teachers adapt the educational process to the educational needs, level of preparation and individual abilities of students, using personalised tasks, flexible learning trajectories and systematic feedback (Storonska & Havryliv, 2024). This approach contributes to improving the effectiveness of learning and creating conditions for students' self-development and self-realisation.

Taken together, these approaches create a motivational educational environment that stimulates cognitive interest, supports intrinsic motivation to learn, and increases student engagement in the educational process. In this context, teacher creativity is not

only a professional characteristic but also an important factor in ensuring the quality and innovative development of modern education.

Pedagogical creativity is one of the key factors in improving the quality of the modern educational process, as it ensures flexibility, innovation and adaptability of learning in line with dynamic social and technological changes (Vitchynkina, 2024). A creative teacher is able not only of transmitting knowledge, but also to develop critical thinking skills, independent analysis of information and creative problem solving in students. The use of non-standard pedagogical approaches, interactive teaching methods and digital tools creates conditions for active cognitive activity among students, which increases their motivation and involvement in the educational process.

An important aspect of pedagogical creativity is effective communication between the teacher and learners. A creative teacher uses various forms of interaction – dialogue methods, project activities, case methods, and digital platforms for collaboration. These formats contribute to the formation of an open educational environment based on partnership, mutual respect, and feedback. This approach not only improves the quality of learning but also develops students' communication skills, which are necessary for their future professional activities.

Pedagogical creativity also plays a leading role in the development of critical and creative thinking in students. Engagement in research tasks, interdisciplinary projects, and creative exercises stimulates students' analytical abilities, develops their ability to argue their own position, evaluate alternative solutions, and generate new ideas (Podenko & Khe, 2023). In this way, the educational process becomes not a reproductive but a productive activity aimed at developing the intellectual potential of the individual.

It is important to note that a creative approach to teaching contributes to the formation of key competencies, in particular digital, social and communication skills. The use of modern educational technologies, multimedia resources, online platforms, and information visualisation tools allows for the integration of educational content into a digital educational environment that meets the needs of the digital generation (Borovets & Yakovyshyna, 2021; Veretiuk, & Chetveryk, 2025). This ensures not only the accessibility of educational materials, but also the development of independent learning skills, information literacy, and the responsible use of digital resources.

Moreover, pedagogical creativity is an important factor in adapting education to the demands of the digital society. In the context of rapid technological change, creative teachers act as agents of innovation, capable of integrating the latest educational practices, digital tools and innovative methods into the learning process (Babak & Vorozhbit-Horbatiuk, 2021). This contributes to the modernisation of the educational environment, increasing its flexibility and relevance to the needs of the labour market.

Through a creative approach to organising instruction, an innovative educational environment is formed that supports students' self-realisation, the development of their creative potential and the formation of their professional identity. Students are given the opportunity to show initiative, participate in project activities, work in teams and implement their own ideas, which has a positive impact on their confidence in their own abilities and readiness for professional activity (Batuchina & Melnikova, 2025). Thus, pedagogical creativity is a strategic resource for improving the quality of education and training competitive specialists in today's digital society.

Special attention should be given to shaping the innovative initiatives aimed at developing teachers' creativity within the educational process. Among the promising

formats, it is worth highlighting the educational event 'Creative Laboratory: Pedagogical Experiments,' aimed at developing the creative thinking of teachers and students by modelling non-standard learning situations. Within this format, participants work in creative teams, develop alternative scenarios for conducting classes, create interactive educational products, and test innovative teaching methods. This form of work encourages teachers to go beyond traditional patterns, experiment with the presentation of educational material, and adapt the educational process to the individual educational needs of students.

Another modern and effective format is the 'Digital Storytelling Campus,' which is based on the use of digital storytelling as a teaching tool. Teachers and students create educational stories in the form of video essays, podcasts, interactive presentations, or virtual comics. This approach promotes the development of creativity, visual thinking, and digital communication skills. Educational content is presented not as dry information, but as an engaging narrative structure that increases emotional engagement, motivation to learn, and depth of material assimilation (Jackson & Jackson, 2024).

The format of the 'Educational Marathon of Ideas' is of particular interest. Its participants develop innovative educational solutions within a limited time frame: digital courses, interactive platforms, mobile applications, or creative teaching methods. The main focus is on the rapid generation of ideas, which develops participants' ability to think creatively in conditions of limited resources and stimulates innovative activity in the pedagogical environment.

The 'Educational Design Studio' format, which focuses on designing the learning environment as a holistic system, plays a special role in the development of creativity. Teachers analyse the educational needs of students and develop original courses, interactive modules and digital learning spaces. The focus is not only on the content of the course, but also on visual aesthetics, the logic of structuring the material and the emotional experience of the students. This approach contributes to the development of pedagogical design as an important area of a teacher's professional activity.

An innovative approach to fostering creativity is the 'Simulation of the Future Classroom' format, which involves modelling the learning environment using modern digital technologies. Participants design virtual classrooms and create digital lesson plans using augmented reality, artificial intelligence elements and interactive platforms. This not only broadens the understanding of the possibilities of modern technologies, but also prepares teachers to implement innovations in the real educational process.

The creative potential of teachers is actively developed in the format of 'Educational Art Synthesis,' which integrates elements of art into educational activities. The use of theatrical practices, visual arts, music and creative writing promotes the emotional involvement of students and creates conditions for a non-standard understanding of the educational material (Vovchasta et al., 2022). Education in this format acquires not only an informative but also a cultural and aesthetic dimension, contributing to the harmonious development of the individual.

Another original format is the 'Educational Start-up Marathon,' in which participants develop concepts for educational products aimed at solving pressing social or professional problems. These can be digital courses, educational platforms, mentoring programmes, or inclusive learning projects. This format promotes innovation and the ability to transform creative ideas into practical educational solutions.

As part of the research, we developed an original university programme called *'Creative Teacher: The Art of Thinking Differently,'* which is structured into eight sessions. Its general idea is aimed at forming a creative style of pedagogical thinking, developing an innovative culture of teaching, and creating a modern educational environment focused on creativity, digital opportunities, and personal self-realisation.

Session 1, 'Going Beyond: How Creative Thinking Is Born,' begins with a discussion of personal pedagogical patterns and habitual teaching models. Participants analyse which established approaches limit their creativity and are introduced to the concept of 'creative thinking' as the ability to see alternatives, combine the incompatible and create new educational meanings. Through associative exercises, metaphorical images, and creative provocations, teachers learn to rethink their own experiences. The result should be an awareness of their own creative potential and a readiness for change.

Session 2. 'Idea Factory: From Concept to Educational Discovery,' involves programme participants working with idea generation techniques that help transform abstract thoughts into concrete educational solutions. Creative tools (visual maps, provocative questions, pedagogical paradoxes) are used to create non-standard lesson formats. The emphasis is not on 'correctness' but on the originality and boldness of ideas. The result of this session should be the formation of a bank of original pedagogical ideas for participants' own practical activities.

During *session 3 'Digital Magic: How Technology Becomes Creative,'* participants explore digital platforms as a means not only of transmitting information, but also of creating an interactive educational experience. Teachers create their own multimedia materials, interactive tasks, visual stories and micro-projects. Technology is seen as a space for creative experimentation. As a result of the session, teachers receive a ready-made digital creative product for use in their lessons.

Session 4. 'Educational stories: how to turn learning into a story' is devoted to creating educational stories in which the learning material is presented through a plot, characters and emotional images. Participants learn to turn dry theory into a fascinating story that arouses interest and is easier to remember. Teachers create their own educational scenarios in the form of videos, comics or interactive presentations.

Session 5. 'Lesson Designer: Creative Lesson Design,' is quite interesting, where participants work on designing lessons in a new format that combine interactivity, visual appeal and pedagogical relevance. Particular attention is paid to the emotional atmosphere, structure of the material and logic of presentation. Teachers create 'creative scenarios' for lessons with a non-standard structure.

Session 6. 'The Language of Influence: Creative Pedagogical Communication' is aimed at understanding communication as an art of professional interaction in the modern educational environment. The lesson focuses on developing the verbal and non-verbal creativity of teachers as important components of pedagogical skills. Participants learn techniques for using figurative language, metaphorical constructions, intonational expressiveness, humour and emotional influence to increase the engagement of learners in the learning process.

Particular emphasis is placed on the role of the teacher's charisma, facilitation skills and empathy in forming a productive educational dialogue based on mutual trust, respect and openness to different points of view. Through creative communication exercises, participants learn to adapt their own style of speech to the individual characteristics of students, create an emotionally rich learning environment, and effectively manage the

dynamics of group interaction. The expected outcome of the session is to increase communicative flexibility, pedagogical expressiveness, and the teacher's ability to influence learning motivation through creative communication.

Session 7. 'Educational Start-up: When Ideas Become Reality' focuses on developing innovative thinking among teachers and their ability to transform creative ideas into practical educational solutions. Participants form teams and develop their own educational projects, which may include digital courses, interactive platforms, original teaching methods, or social and educational initiatives aimed at solving pressing problems in the educational environment. In the course of project activities, teachers analyse the needs of the target audience, define educational goals, develop a product concept and consider ways to implement it. The main focus is on the practical value of the proposed ideas, their viability and the possibility of their implementation in the real educational process. The expected outcome of this session is the creation of ready-made concepts for educational innovations that can be used as a foundation for further professional growth of teachers.

The *final session, 'Creative Teacher of the Future: The Path to Professional Transformation,'* is devoted to deep reflection on the personal and professional development of programme participants. The focus is on awareness of one's own creative identity, rethinking pedagogical values, and analysing changes in teaching style. Participants assess how their thinking, attitude to innovation, and willingness to experiment with new forms of learning have transformed. Particular importance is given to the formation of an individual trajectory for further creative growth, which includes defining professional goals, areas of self-development, and resources for achieving them. Through reflective practices, educators become aware of their own potential as agents of change in modern education and develop a readiness for continuous renewal of their pedagogical activities. The result of the session is the development of a personal plan for creative professional development, focused on long-term self-realisation in the context of the digital transformation of education.

DISCUSSION

The results of the study confirm the relevance of teacher creativity as a key factor in the modernisation of the educational process in the context of digital transformation. The data obtained are consistent with contemporary scientific approaches that view teachers not only as carriers of knowledge, but also as facilitators of learning, designers of educational environment, and initiators of innovative changes. The increase in creative activity, flexibility of thinking, and openness to pedagogical experiments demonstrates the effectiveness of creatively oriented formats for teacher professional development.

At the same time, the results of the study allow us to expand the traditional understanding of pedagogical creativity. Whereas previously it was mostly associated with the use of non-standard teaching methods, in modern conditions it is becoming systematic in nature and also encompasses digital competence (Kostikova et al, 2021), the ability to design educational projects, facilitation, communicative expressiveness, and reflective activity. Thus, creativity is transforming from an individual personality trait into a strategic resource for the development of educational institutions.

The role of reflection in shaping the creative identity of teachers deserves special attention. Reflective practices integrated into the author's programme helped teachers become aware of their own professional changes, rethink their values and form individual development trajectories. This is in line with contemporary ideas about

continuous professional development as a process of self-construction of pedagogical activity in conditions of rapid educational change.

At the same time, the results of the study indicate the need for institutional support for teachers' creativity. Without the creation of a supportive educational environment that encourages pedagogical experimentation, interdisciplinary interaction, and innovation, the creative potential of teachers may remain unrealised. This underscores the importance of fostering a culture of innovation in educational institutions as a condition for the sustainable professional development of teachers.

The issue of the optimal balance between a teacher's creative freedom and the regulatory requirements of educational standards and curricula remains debatable. On the one hand, creativity requires autonomy, flexibility and room for experimentation; on the other hand, the educational process must meet certain academic requirements. Further research may focus on finding a balance between these two components and developing models for supporting creativity within a formalised educational system.

CONCLUSIONS

The study confirmed the relevance of the issue of developing university teachers' creativity in the context of the digital transformation of higher education and its direct impact on the quality of the educational process. Modern university teachers are not only bearers of knowledge, but also organisers of creative learning environments, facilitators of educational interaction and initiators of innovative changes. In this context, creativity emerges as a strategic resource for the modernisation of education, ensuring the adaptation of pedagogical activities to the needs of a digital society.

The study substantiated the feasibility of using innovative formats for developing university teachers' creativity, which combine digital technologies, interdisciplinary approaches and creative teaching methods. Such formats promote openness to change, readiness for pedagogical experiments and the ability to create individualised educational trajectories for learners.

The article presents the author's programme 'Creative Teacher: The Art of Thinking Differently,' which is structured into eight lessons. Its general idea is aimed at forming a creative style of pedagogical thinking, developing an innovative culture of teaching, and creating a modern educational environment focused on creativity, digital opportunities, and personal self-realisation.

This way, university teacher creativity should be considered a key factor in improving the quality of education, forming an innovative culture, and developing a competitive educational environment. Further research may be directed towards the development of digital tools to support creativity, the study of intercultural aspects of pedagogical creativity, and the creation of models for the continuous professional development of teachers in a globalised educational space.

CONFLICT OF INTERESTS

The authors declare that there are no conflicts of interest regarding the publication of this paper.

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ARTIFICIAL INTELLIGENCE STATEMENT

No artificial intelligence tools were used in the preparation of this manuscript.

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READING IN THE DIGITAL AGE: OPPORTUNITIES OF ARTIFICIAL INTELLIGENCE IN TEACHING GERMAN AS A FOREIGN LANGUAGE

ЧИТАННЯ В ЦИФРОВУ ЕПОХУ: МОЖЛИВОСТІ ШТУЧНОГО ІНТЕЛЕКТУ У ВИКЛАДАННІ НІМЕЦЬКОЇ МОВИ ЯК ІНОЗЕМНОЇ

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ABSTRACT

Purpose. The article examines transformative approaches to teaching reading in German as a Foreign Language (*Deutsch als Fremdsprache – DaF*) in the context of the digitalization of education. It analyzes the use of AI and the LATILL platform (Level-Adequate Texts in Language Learning) for implementing differentiated reading instruction. The main focus is placed on the concepts of differentiation, individualization, and personalization of learning as key strategies for working in heterogeneous groups.

Methodology. This research utilizes theoretical analysis to define differentiation and personalization, alongside PRISMA thematic synthesis and Biblioshiny bibliometric mapping to visualize research trends. Methodological application includes pedagogical modeling for group profiling and task planning, complemented by the

Мета. У статті досліджуються трансформаційні підходи до навчання читання німецької мови як іноземної (*Deutsch als Fremdsprache – DaF*) у контексті цифровізації освіти. Аналізується використання штучного інтелекту (ШІ) та платформи LATILL (Level-Adequate Texts in Language Learning) для впровадження диференційованого навчання читання. Основна увага приділяється концепціям диференціації, індивідуалізації та персоналізації навчання як ключовим стратегіям роботи у гетерогенних групах.

Методологія. У дослідженні використано теоретичний аналіз для уточнення термінологічного апарату (диференціація та персоналізація), а також тематичний синтез (PRISMA) та бібліометричне картування Biblioshiny для візуалізації дослідницьких трендів. Методичне застосування включає педагогічне моделювання для створення профілів груп і

case method to analyze CEFR-adapted texts.

Results. Based on a bibliometric analysis of 129 publications in the Scopus database and a meta-analysis of seven empirical studies conducted in 2017–2024, the high effectiveness of differentiated instruction has been demonstrated, showing improvements in reading comprehension and grammar with a pooled mean difference of 2.92. The role of artificial intelligence and specialized digital platforms, particularly the LATILL platform, in automating the creation of level-appropriate texts corresponding to students' knowledge according to the CEFR scale is analyzed. The methodology for creating a class profile to optimize the selection of learning resources is determined. The results of the study demonstrate that the use of AI allows the teacher to move from the role of a transmitter of knowledge to the role of a facilitator, providing each learner with relevant content and support. Cases of adapting materials "Berlin/Vienna" for different levels of language proficiency were demonstrated.

Conclusions. The digital age demands replacing unified instruction with differentiated, individualized, and personalized pathways. Empirical data confirms that differentiated instruction significantly outperforms traditional methods, yielding a 2.92 pooled mean difference in language proficiency. Tools like LATILL and AI automate CEFR-aligned text creation, enabling teachers to shift from transmitters to facilitators. While differentiation and individualization adjust methods and pace, personalization allows students to co-create their learning experience based on personal interests. Ultimately, AI is a supportive resource that strengthens pedagogy.

Keywords: artificial intelligence, DaF (German as a Foreign Language), differentiated instruction, digitalization, LATILL, personalization, reading competence.

планування завдань, доповнене кейс-методом для аналізу текстів, адаптованих до рівнів CEFR.

Результати. На основі бібліометричного аналізу 129 публікацій у базі даних Scopus та мета-аналізу семи емпіричних досліджень, проведених у 2017–2026 рр., доведено високу ефективність диференційованого навчання, що демонструє покращення розуміння прочитаного та граматики із показником pooled mean difference 2,92. Проаналізовано роль ШІ та спеціалізованих цифрових платформ, зокрема платформи LATILL, у автоматизації створення рівнево-адекватних текстів відповідно до шкали CEFR. Визначено методику створення профілю класу для оптимізації вибору навчальних ресурсів. Результати дослідження показують, що використання ШІ дозволяє вчителю перейти від ролі транслятора знань до ролі фасилітатора, забезпечуючи кожного учня релевантним контентом та підтримкою. Продемонстровано кейси адаптації матеріалів «Берлін/Відень» для різних рівнів володіння мовою.

Висновки. Цифрова епоха вимагає відмови від уніфікованого навчання на користь диференційованих, індивідуалізованих та персоналізованих траєкторій. Емпіричні дані підтверджують, що диференційоване навчання значно перевершує традиційні методи. Інструменти, такі як LATILL та ШІ, автоматизують створення текстів за рівнями CEFR, дозволяючи вчителям стати фасилітаторами. У той час як диференціація та індивідуалізація коригують методи та темп, персоналізація дозволяє учням спільно з ШІ створювати власний навчальний досвід на основі особистих інтересів. Зрештою, ШІ є допоміжним ресурсом, який зміцнює педагогіку.

Ключові слова: штучний інтелект, німецька як іноземна (DaF), диференційоване навчання, цифровізація, LATILL, персоналізація, читальська компетентність.

INTRODUCTION

The modern educational reality requires a decisive rejection of outdated teacher-centered methods in which students are viewed as passive listeners who merely absorb ready-made facts. In heterogeneous groups of *German as a Foreign Language* (DaF), learners differ significantly in terms of readiness level, interests, learning styles, and life experience, which makes the traditional "teaching of the average student" ineffective, since the needs of a significant part of the audience remain unmet. There is no such thing as an "average person" in nature and when we design a system (for example, an

educational curriculum) for the “average student”, we are actually creating something that is perfectly suited for no one (Rose, 2016).

Reading in the digital age as a complex cognitive activity requires the introduction of new approaches that allow maximizing the potential of each student through the use of adaptive technologies. Traditional roles and methodologies are becoming “redundant”, whereas the current Next-Gen (next generation) society demands transition to personalized and adaptive learning environments (Ahibalova et al., 2025). The problem is that the development of separate lesson plans for each student manually is physically unrealistic for the teacher due to high workload (Terletska, 2024).

However, artificial intelligence (AI) technologies open new opportunities for scaling personalized learning, and the Industry 5.0 paradigm proposes a transition to human-centered interaction, where AI becomes an intelligent partner that complements rather than replaces human intelligence (Ahibalova et al., 2025). This shift reflects the broader evolution of Computer Assisted Language Learning (CALL) into Intelligent CALL (ICALL) and Networked Learning (NL) (Kannan & Munday, 2018). Networked Learning, in particular, emphasizes the use of Open Educational Resources, which supports the transition of the teacher's role from a knowledge transmitter to a facilitator who helps students self-regulate their learning beyond traditional curricula (Kannan & Munday, 2018).

Moreover, when implemented within a human-centered and ethically responsible framework, generative AI serves as a powerful educational tool that enhances students' emotional health, motivation, and independence, thus satisfying psychological needs for competence and social connection, leading to improved outcomes (Gulich & Chetveryk, 2025; Chetveryk & Veretiuk, 2025). Recent research (Zafar et al., 2025; Shevtsova et al., 2025; Yilmaz & Aydin, 2025) indicates that AI acts as a dynamic scaffold for reading in German as a foreign language by providing personalized, real-time support. Furthermore, AI-generated content enhances learner motivation by addressing specific user interests and proficiency levels, while simultaneously reducing cognitive load during the comprehension of complex texts.

The theoretical foundation of differentiated instruction is based on the fundamental works of C. Tomlinson, who emphasizes the need to adapt the content, process, and product of learning according to students' needs (Tomlinson, 2014; Goyibova et al., 2025). This approach is closely connected with the concept of the Zone of Proximal Development by L. Vygotsky, where learning is most effective when it slightly exceeds the learner's current level of capability (Goyibova et al., 2025).

Recent studies, particularly by Dale Basye, allow clear differentiation between key terms:

- Differentiation – answers the question “how” the teacher adapts the path to knowledge based on students' interests or readiness (Basye, 2018).
- Individualization – focuses on the question “when”, allowing learners to progress through the curriculum at their own pace (Basye, 2018).
- Personalization – combines both approaches, where the learner actively participates in creating learning activities based on their own curiosity (Basye, 2018; Ahibalova et al., 2025).

A bibliometric analysis of publications in the Scopus database (2000–2024) demonstrates growing global interest in this topic: 13% of all *differentiated instruction* (DI) studies today relate specifically to higher education, while foreign language teaching (especially ESP) is one of the leading research clusters (Terletska, 2024).

Despite a significant number of general theoretical developments by authors such as L. Cameron, P. Anstey, or M. Gerschon (British Council, 2024), there remains a significant gap in the modern literature regarding the practical application of AI tools for the automatic adaptation of DaF texts to specific CEFR proficiency levels (A1–C2). A shortage of empirical studies regarding the integration of corpus technologies into teacher training for the creation of data-oriented exercises that take into account the real linguistic needs of students has also been identified (Judith, 2025).

For this reason, the LATILL project (Level-Adequate Texts in Language Learning) aims to fill these gaps by offering German language teachers a methodology for selecting and creating texts that clearly correspond to curriculum requirements and individual learner profiles in the digital age.

The **purpose** of the article is a comprehensive analysis of the possibilities of digital tools and AI, and the LATILL platform for implementing a differentiated approach to teaching reading in German language classes.

The relevance of the study is determined by the necessity of implementing an activity-based approach in the context of digital transformation, where the teacher must use adaptive technologies to ensure high learning outcomes for each student and move toward “Next-Generation Foreign Language Learning,” where digital tools reduce language anxiety and increase students’ self-efficacy in a heterogeneous environment.

The object of the study is the process of developing students’ reading competence in German as a Foreign Language classes in a digital inclusive environment. The subject of the study: methodological algorithms, digital resources (in particular the LATILL platform and AI tools), and group profiling strategies for differentiation and personalization of reading instruction.

METHODOLOGY

The study used the analysis of scientific sources to clarify the terminological apparatus (differentiation and personalization), thematic synthesis (PRISMA) to analyze trends in 2020–2025, bibliometric analysis (Bibliometrix / Biblioshiny) to visualize networks of co-occurrence of terms, pedagogical modeling – creation of templates of group profiles and plans of differentiated tasks, and the case method – analysis of examples of texts of different levels of complexity (using the example of the topics “Berlin” and “Wien”).

RESULTS

The analysis of sources allows a clear distinction of the terminological apparatus, which is often mistakenly used as synonymous, in particular the concepts of differentiation, individualization, and personalization.

Thus, differentiation is considered a strategic response of the teacher to the diversity of students in the classroom (Tomlinson, 2014; Rapti & Panagiotidis, 2024), as the process or fact of making something different from similar things (from Latin *differentia* – difference) (Goyibova et al., 2025), and in the context of education it is an approach that recognizes the absence of a single method suitable for all and involves adapting teaching techniques, content, and assessment methods according to the strengths and weaknesses of each student (Goyibova et al., 2025; Rapti & Panagiotidis, 2024).

Differentiation is the answer to the question “how” the teacher adapts the path to knowledge (Basye, 2018), remaining the central figure who, based on the class profile, modifies the content, process, product, or learning environment (Tomlinson, 2014). The teacher’s goal is to

ensure that all learners have access to the lesson content so that each can achieve one common goal but through different ways and at their own pace (Basye, 2018).

Personalization is a deeper level of adaptation that shifts the focus to the active role of the learner. Its essence lies in combining differentiation and individualization, where the learner actively participates in creating their own educational trajectory (Basye, 2018). Personalization connects academic goals of the curriculum with the personal interests and abilities of a particular student. Unlike differentiation, where the path is determined by the teacher, personalization relies on the learner’s natural curiosity and choice (Basye, 2018). In modern conditions personalization is often implemented through AI and digital platforms (for example, LATILL), which allow automatically generating content that resonates with the learner’s personal experience.

Individualization is often distinguished as a component that focuses on time boundaries (Basye, 2018). If differentiation is “how,” then individualization is “when,” and learning is calibrated according to the unique pace of each student. This approach allows learners who have already mastered the material not to waste time on repetition, while those who require deeper immersion move more slowly (Basye, 2018).

Table 1
Comparison of approaches of differentiation, individualization and personalization

Concept	Key question	Who controls the process
Differentiation	“How?” (methods, pathways)	Teacher (adapts instruction)
Individualization	“When?” (pace)	Teacher/System (adjusts speed)
Personalization	“Why?” (interest and activity)	Student + Teacher/AI (jointly create the pathway)

Thus, differentiation is a necessary condition for an inclusive environment, whereas personalization represents the highest point of adaptability, where the learner becomes a co-author of their learning.

The analysis of 129 publications in Scopus until 2024 revealed 9 key clusters of research on differentiated instruction in higher education.

Table 2
Clustering of DI research (according to Biblioshiny data)

Cluster No.	Key terms	Impact	Centrality
1 (Largest)	Foreign language for specific purposes (mainly English), inclusive education, differentiated instruction	2.631	1.637
5	Administration/supervision, bibliometrics, higher education	0	1.995
6	Flipped classroom, collaboration, block learning	1.25	0.341
9	Students with visual impairments, curriculum design, English language teaching	3.579	1.22

Cluster 1 is the most powerful in the context of foreign language teaching, as it combines high centrality (connections with other topics) and significant impact (number of

citations). Cluster 5 demonstrates the highest centrality (1.995), indicating strong interest in administrative aspects and research methodology of differentiated instruction in modern science, although the absence of an impact indicator suggests the relative novelty of this direction. Cluster 6 reflects the integration of DI with innovative formats such as flipped learning. Cluster 9 has the highest impact indicator (3.579), emphasizing the high scientific value and citation level of narrowly specialized studies devoted to inclusive education (in particular, visually impaired students) within language education.

Cluster 1 demonstrates the highest citation level and focuses mostly on English for Specific Purposes (ESP), which is relevant for DaF. Cluster 9 has the maximum impact, highlighting the critical role of DI for students with special needs. The absence of impact in cluster 5 indicates the novelty of administrative aspects of DI digitalization.

A meta-analysis of the effectiveness of the differentiated approach was also conducted. A systematic review of seven empirical studies (2017–2024) confirmed a significant advantage of differentiated instruction over traditional methods.

Table 3
Statistical indicators of the effectiveness of differentiated instruction

Parameter	Value	Interpretation
Pooled Mean Difference	2.92	Indicates a significant improvement in students' language skills, particularly grammar, reading comprehension, and speech fluency compared to traditional teaching methods.
95% Confidence Interval	[1.64–4.19]	Confirms statistical reliability of the results; since the interval does not include zero, the effect of DI implementation is considered statistically significant.
Heterogeneity (I^2)	87%	Indicates high variability of results, emphasizing the significant influence of context, individual learner characteristics, and specific differentiation strategies on the final success.

These data support the role of the differentiated approach as an effective pedagogical strategy in multilingual classrooms that promotes equitable learning and increases student engagement. Differentiated instruction has the strongest impact on reading comprehension and grammar because it allows adapting structural complexity to the learner's readiness level. This argument is further strengthened by research, which found that differentiated reading instruction significantly improves students' self-efficacy and autonomy (Shovkovyi et al., 2020; Gülşen & Mede, 2019), while differentiated approaches that account for individual capabilities directly enhance students' self-belief in their own abilities.

In the context of a differentiated approach to teaching reading in foreign language classes, artificial intelligence is an important facilitation tool. Personalized and differentiated learning with AI relies on the learner's interests and natural curiosity. Technologies allow:

1. Adapting the pace: learners can review material or move faster depending on their mastery.
2. Creating choice: AI helps generate different formats (text, comic, interactive article) on the same topic.

3. Providing feedback: automated assessment and real-time hints.

The LATILL platform (Level-Adequate Texts in Language Learning / Niveaugerechte Lesetexte im DaF-Unterricht) is a specialized digital tool designed to improve reading skills in German as a Foreign Language classes in the context of digitalization and acts as an adaptive technology that allows the teacher to move from the role of a transmitter to that of a facilitator.

The main tools and capabilities of the platform include:

- Selection of texts by difficulty levels (CEFR): the platform allows the teacher to choose learning materials that clearly correspond to the students' knowledge level according to the Common European Framework – from beginner (A1) to advanced. This makes it possible to work on one topic with the entire class but provide each group of students with a text of the appropriate linguistic level.
- Variety of content formats: to meet the needs of students with different learning styles (visual, auditory, digital), LATILL offers texts in various formats: short articles, comics, and pictures.
- Tools for task differentiation: the platform supports the development of tasks adapted to specific needs:
 - by degree of complexity: for the basic level (for example, fill-in-the-gaps, "match" tasks) and for advanced learners (open questions, creation of presentations or personal projects).
 - by volume and time: the possibility to select texts according to curriculum requirements regarding the number of words.
- Resource for lesson planning: LATILL is classified as an important lesson-planning resource that helps teachers move away from relying on a single textbook, which is often oriented toward the "average student", and create more flexible lesson plans, allowing teachers to independently generate adapted "text bundles" (Kienberger et al., 2023; García-Holgado et al., 2024).
- Adaptation to students' interests: the platform allows selecting content that resonates with students' personal experiences and interests, which is critically important for transitioning from simple differentiation to personalized learning.

Thus, the LATILL platform provides each learner with an appropriate level of challenge and support and allows selecting texts according to curriculum requirements and students' CEFR levels.

Table 4

Types of differentiation in teaching reading

Type of differentiation	Tools and methods
By resources	Use of PPT, audio, video, websites (LATILL, Goethe-Institut)
By tasks	Fill-in-the-gaps (A1), open questions (B2), creation of presentations
By interaction	Pair work "leader-student," team projects, changing group composition
By support	Dialogue frameworks, dictionaries, step-by-step instructions from the teacher

Task-based differentiation is a highly effective strategy for managing reading instruction in mixed-ability classrooms. Teachers can adapt these tasks by adjusting the level of complexity; students who require more guidance can use sentence frames, diagrams, or dialogue models, while more independent learners can be challenged with creative projects like posters or in-depth reports.

Additionally, it is important to vary the form of execution to accommodate different learning styles, including visual, auditory, reading / writing, and kinesthetic preferences. Student interaction also plays a role, as grouping learners of different levels allows stronger students to lead and model reading strategies during teamwork. This entire framework is sustained by targeted teacher support, which ensures that assistance is provided where it is most needed within the classroom.

For successful differentiation teachers must know their students (Basye, 2018); therefore, creating a class profile is an important stage of preparation.

Creating an effective class profile (or “collective portrait” of the group) is a critically important stage for implementing differentiated instruction and also helps identify learning barriers. As D. Littky notes (Littky, 2004), it is practically impossible to make educational content relevant for those you do not know.

Step-by-step instruction for creating a class profile includes:

1. Determining key categories of analysis.

An effective profile should include detailed information about learner characteristics. According to the sources (Basye, 2018; Tomlinson, 2014; Goyibova, 2025), the following categories should be included:

- Readiness: current level of knowledge and skills (for example, distribution of the class into basic, lower, and advanced levels in percentage terms).
 - Interests: topics, skills, or activities that attract or inspire learners (for example, hobbies, professional interests).
 - Learning preferences: how students best perceive information – visually, aurally, through movement (kinesthetic), or in digital format.
 - Special educational needs: presence of learners with visual impairments, hyperactivity, or other learning barriers.
 - Experience and motivation: life circumstances, previous knowledge, and attitudes toward language learning.
2. Methods of collecting information. The profile does not necessarily have to be a dry formal document; it may be formed through a series of conversations or interactive exercises:
 - Needs analysis: conducting surveys to understand students’ preferences and abilities.
 - Interactive questionnaires: using colored sheets of paper where students write their name, favorite topic, email, and ask questions to colleagues.
 - Gamification and brainstorming: questions about mood, habits (for example, coffee or tea) and ways of perceiving information help the teacher quickly “read” the atmosphere in the group.

3. Structuring the data. Table 5 below illustrates the corresponding categories, parameters for analysis and methods of collecting information.

Table 5

Categories of the collective portrait of the group

Category	Parameters for analysis	Method of collection
Readiness	Current level of knowledge and skills (distribution in %: basic, lower, advanced)	Tests, interactive exercise using “colored sheets” of paper
Interests	Hobbies, professional goals, topics or activities that inspire curiosity (sport, music, technology, etc.)	Brainstorming, ice-breaker questions (for example, “Did you drink coffee or tea today?”)
Learning styles	Channels of information perception: visual, auditory, kinesthetic, digital	Needs analysis, pedagogical observation
Special needs	Students with visual impairments, hyperactivity, etc.	Needs analysis, pedagogical observation

Creating such a profile is a critical stage of lesson preparation. The use of gamification elements (colored questionnaires, quick surveys) allows the teacher not only to collect data but also to create an atmosphere of trust and a sense of community in the classroom where every learner feels important.

DISCUSSION

The obtained results and analysed strategies of using AI to differentiate in the German-language classroom when teaching reading allow to illustrate how after creating the profile, the teacher can move to planning differentiated tasks, particularly with the help of the LATILL platform.

The created profile allows the teacher to:

- Adapt resources: select texts of different complexity (A1 or B2) on the same topic.
- Vary tasks: propose fill-in-the-gaps tasks for some students and creation of presentations for others.
- Identify real language patterns and errors through integration of corpus data. For example, corpus analytics can reveal overuse/underuse of logical connectors in students’ writing.
- Organize interaction: combine students into “leader-student” pairs or change group composition depending on readiness.

An effective profile is a tool that helps the teacher become a facilitator who pushes each learner slightly beyond their current abilities while ensuring respect and the significance of each person in the classroom.

As a next step within the study, 2 texts available on the LATILL platform (LATILL, 2025) about German-speaking capitals were tested as for their adaptation and study materials creation:

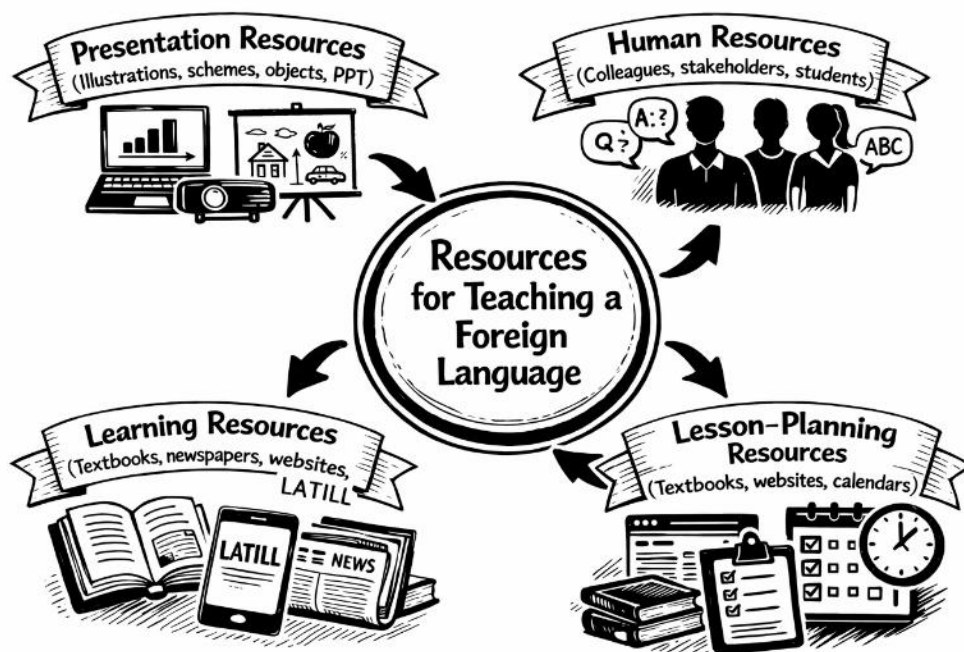
- Level A1–A2 (“Von Berlin nach Berlin”): a text about Axel Schloffer (37 years old), who travels among different Berlins in the world. Tasks: *Match the pictures*, *Fill the gaps*. AI is used here to simplify vocabulary to the basic level.
- Level B2 (“Wien, die Stadt der Möglichkeiten”): a deep analysis of social integration and cultural opportunities in Vienna. Complex structures (Konjunktiv II) are used. Task: argumentative debates with an AI bot about urbanism.

This confirms that the teacher can use one topic for the whole class but differentiate the complexity of the text itself (thanks to AI generation or LATILL) and the depth of questions to it. A differentiated lesson should rely on flexibility, respect, and cooperation.

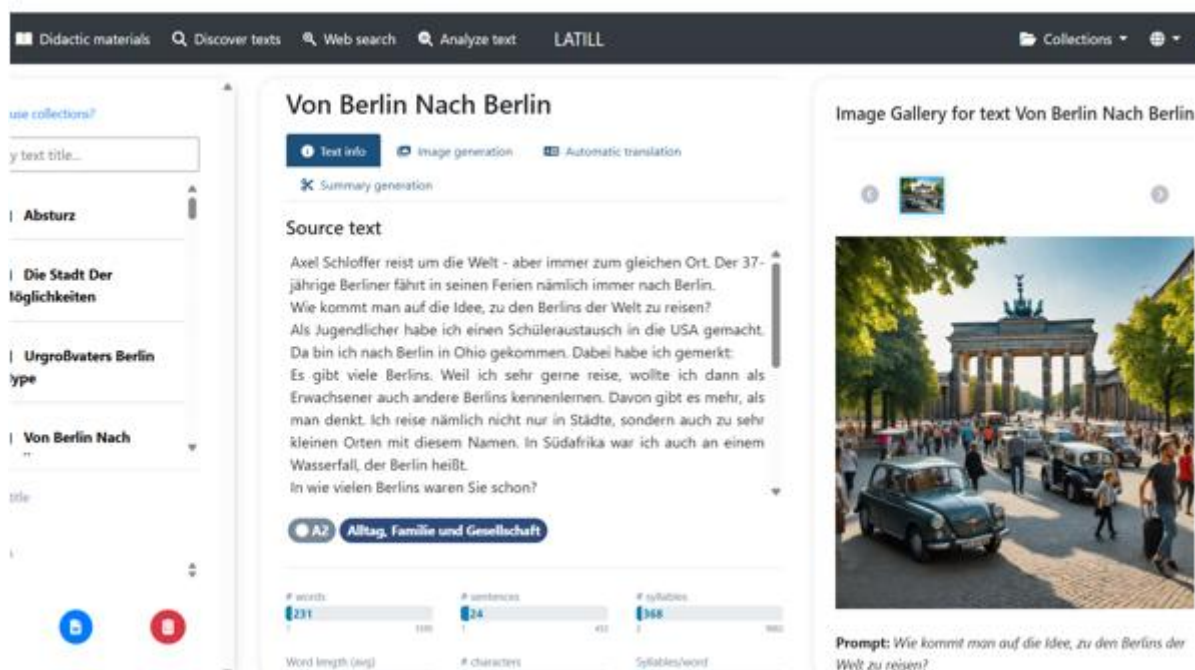
The teacher can effectively combine the types of resources presented in Figure 1, using the capabilities of the LATILL platform and artificial intelligence (AI) to meet the needs of a heterogeneous group. The teacher can also integrate reading subskills that develop in the digital age: prediction, scanning, distinguishing facts, and drawing conclusions. AI allows the automation of exercises for each of these subskills.

Figure 1

Types of resources for teaching reading



Presentation resources (PPT) play a key role in visualizing material, which is particularly important for learners with a visual learning style. Presentation Resources via visual tools such as a blackboard, laptop, projector, and screen may include illustrations, texts, schemes, objects, and PowerPoint presentations, ensuring that teachers present and explain new material in a clear and engaging way. Using the LATILL platform, the teacher can demonstrate not only text fragments but also CEFR-adapted illustrations, comics, or content schemes that help learners at beginner levels (A1–A2) understand the main idea without complex lexical decoding. Presentations become a tool for developing the subskill of prediction through the demonstration of titles and images at the pre-reading stage, see Figure 2, which demonstrates an illustration of the text “Von Berlin nach Berlin”.

Figure 2*Image for the text created with LATILL platform*

Human resources allow differentiation by interaction. This category includes colleagues, stakeholders, and students, emphasizing communication, collaboration, and interaction as essential elements of language teaching. Based on the previously created class profile, where readiness levels and students' interests are identified, the teacher can combine students into flexible groups or "leader-student" pairs (Littky, 2004). Colleagues can collaborate through the LATILL platform to exchange developed differentiated tasks, and students in groups can discuss the reading using "dialogue frameworks" (scaffolding) provided by AI assistants to support communication.

Learning resources, which can be represented by textbooks, newspapers, websites, and LATILL, focusing on materials students use directly for learning and practicing the language. In particular, the LATILL platform (Level-Adequate Texts in Language Learning) can serve as the foundation for content differentiation. It provides access to texts of different complexity on the same topic. For example, when studying the topic "Berlin," the A1 group works with a short text about facts and first impressions, performing scanning exercises (fill the gaps), while the B2 group analyzes a complex article about social integration, practicing inference skills. This allows each learner to work within their own "zone of proximal development," avoiding teaching the "average student" (Basye, 2018).

Besides, lesson-planning resources help structure the learning process through stages:

- Pre-reading: activation of prior knowledge using AI-generated keywords and visual stimuli.
- Reading: completion of automated AI exercises for understanding text structure and linguistic-semantic aspects.
- Post-reading: transition from differentiation to personalization, where higher-level learners create their own creative projects (posters, presentations) or participate in debates with LLM based on the reading.

Due to adaptive technologies such as LATILL, the teacher moves from the role of a transmitter of knowledge to the role of a facilitator who makes content relevant, accessible, and engaging for every learner.

CONCLUSIONS

The digital age requires abandoning unified instruction. Differentiation is not the development of 30 different plans but the creation of different pathways to one goal. Modern DaF instruction must move beyond “average student” methods to embrace differentiation, individualization, and personalization. Meta-analysis proves that differentiated instruction significantly outperforms traditional methods, yielding a 2.92 pooled mean difference in language skills.

AI and platforms like LATILL facilitate this by automating the creation of CEFR-aligned texts (A1–C2), allowing teachers to shift from transmitters of knowledge to facilitators. While differentiation and individualization adjust pathways and pace, personalization represents the highest adaptability where students co-create their journey. Learning effectiveness increases when students feel a connection between the curriculum and their own experience. Ultimately, AI will not replace the educator, but the teacher who utilizes AI will replace the one who does not.

Further research is needed on the ethics of using AI in creating tasks and assessing students' creative work, as well as the development of algorithms for the automatic creation of individual “student success profiles” based on data from educational platforms.

CONFLICT OF INTEREST

The author declares that there are no conflicts of interest regarding the publication of this paper.

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No artificial intelligence tools were used in the preparation of this manuscript.

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CONTEMPORARY EDUCATIONAL PARADIGMS IN SHAPING STUDENTS' VALUE ORIENTATIONS

СУЧАСНІ ОСВІТНІ ПАРАДИГМИ У ФОРМУВАННІ ЦІННІСНИХ ОРІЄНТАЦІЙ СТУДЕНТСТВА

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ABSTRACT

Purpose. This study aims to conceptualize and systematize contemporary educational paradigms that contribute to the formation of value orientations among university students. It addresses the need to integrate humanistic, ethical, and sustainability-oriented competencies into higher education in the context of globalization, digital transformation, and socio-political instability in Ukraine. The research bridges global approaches such as Social and Emotional Learning (SEL), Global Citizenship Education (GCED), and Education for Sustainable Development (ESD) with their adaptation in Ukrainian higher education.

Methodology. The study employs a theoretical and conceptual design based on analysis, synthesis, comparison, and systematization of scholarly literature (2022–2026). Interdisciplinary sources from pedagogy, psychology, philosophy, and cultural studies were selected according to relevance and

Метою статті є концептуалізація та систематизація сучасних освітніх парадигм, що сприяють формуванню ціннісних орієнтацій студентської молоді. Увагу зосереджено на інтеграції гуманістичних, етичних і сталорозвиткових компетентностей у систему вищої освіти в умовах глобалізації, цифрової трансформації та соціально-політичної нестабільності в Україні. Дослідження спрямоване на узгодження підходів: соціально-емоційного навчання (СЕН), освіти для глобального громадянства (ОГГ) та освіти для сталого розвитку (ОСР) з їх адаптацією у вітчизняному освітньому контексті.

Методологія. Дослідження має теоретико-концептуальний характер і базується на методах аналізу, синтезу, порівняння та систематизації наукових джерел за 2022–2026 рр. Застосовано міждисциплінарний підхід у межах педагогіки, психології, філософії та культурології. Відбір здійснювався за

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academic rigor. The methodology integrates analytical-interpretative, comparative, systemic-structural, and hermeneutic approaches. No empirical data or statistical procedures were used; validity was ensured through theoretical triangulation.

Results. Higher education shows a shift toward value-oriented paradigms integrating sustainability, ethics, and social responsibility. SEL, GCED, and ESD enhance empathy, resilience, and civic engagement. Student-centered and experiential learning strengthen motivation and value internalization, while digital technologies support ethical behavior and self-regulation. However, gaps remain between declared values and actual behavior, along with challenges in implementation, teacher preparedness, and assessment.

Conclusions. Value orientations are a core component of student development and educational effectiveness. Integrating SEL, GCED, and ESD into a unified framework strengthens value-based education. Universities should adopt systemic strategies to embed ethical and sustainability values into curricula. Future research should focus on longitudinal and cross-cultural perspectives.

Keywords: digital ethics, experiential learning, global competence, humanistic education, social responsibility, student engagement, sustainability literacy.

критеріями релевантності та наукової достовірності. Використано аналітико-інтерпретаційний, порівняльний, системно-структурний і герменевтичний підходи. Валідність результатів додатково забезпечено теоретичною тріангуляцією.

Результати. Виявлено посилення ціннісно орієнтованих парадигм у вищій освіті, що інтегрують принципи сталого розвитку, етики та соціальної відповідальності. Підходи СЕН, ОГГ та ОСР сприяють розвитку емпатії, резильєнтності та громадянської активності студентів. Студентоцентроване й досвідне навчання суттєво посилює мотивацію та внутрішню інтерналізацію цінностей, а цифрові технології підтримують формування етичної поведінки і саморегуляції. Виявлено розрив між задекларованими цінностями та їх практичною реалізацією, а також проблеми впровадження й оцінювання результатів.

Висновки. Ціннісні орієнтації є ключовим чинником розвитку особистості та ефективності освіти. Інтеграція СЕН, ОГГ і ОСР у цілісну модель підсилює результативність сучасної освіти. Заклади вищої освіти мають впроваджувати системні стратегії інтеграції етичних і сталих цінностей у навчальний процес. Подальші дослідження доцільно спрямувати на лонгітюдні та крос-культурні підходи.

Ключові слова: глобальна компетентність, гуманістична освіта, досвідне навчання, соціальна відповідальність, сталий розвиток, студентська залученість, цифрова етика.

INTRODUCTION

In the context of accelerating globalization, digitalization, and the rapidly shifting higher education landscape, the formation of student value orientations has become a critical challenge. Higher education institutions are increasingly required to cultivate graduates capable of responding to emerging global risks while maintaining resilience, humanism, and ethical integrity amid societal and technological transformations. As UNESCO (2024a) emphasizes, education must function as a strategic vehicle for developing global citizenship grounded in sustainable development, human dignity, and social responsibility within an increasingly diverse world. A central function of contemporary higher education is fostering values such as empathy, ecological awareness, critical thinking, and peacebuilding. Research highlights the importance of inclusive learning environments that support all students and promote participation, mutual respect, and shared responsibility. Evidence from the region shows that such approaches help develop socially responsible and value-oriented citizens (UNESCO, 2025).

Within this emerging paradigm, new educational approaches, particularly Social and Emotional Learning (SEL), Global Citizenship Education (GCED), and Education for Sustainable Development (ESD), play a decisive role in integrating humanistic principles into teaching and learning. These frameworks prioritize not only knowledge

acquisition but also the formation of personal dispositions conducive to active civic engagement, intercultural dialogue, and responsible stewardship of social and environmental systems (UNESCO, 2024b; OECD, 2025a). Their implementation reflects a broader pedagogical shift from transmissive models of instruction toward holistic approaches that support the internalization of ethical and reflective competencies. At the same time, long-term international foresight initiatives highlight the growing importance of transversal skills, adaptability and learner agency in response to future skill demands and complex societal transformations (OECD, 2025b).

In Ukraine, where processes of European integration are unfolding concurrently with wartime disruptions, higher education assumes an expanded societal role. Socio-political crises and migration dynamics further influence student value orientations, particularly under conditions of war or displacement (World Bank, 2023). Recent analyses indicate that post-war Ukrainian higher education is increasingly adopting digitalization and global best practices to foster resilient and adaptable graduates (Palchuk, 2025). It is also implementing strategies to enhance ICT skills among students with diverse learning needs (Serero & Schlebusch, 2025). Beyond professional training, higher education serves as a mechanism for societal cohesion, peacebuilding, and the development of students' spiritual maturity. However, despite growing recognition of the importance of humanistic competencies, academic achievement frequently dominates institutional priorities, while value formation remains insufficiently integrated into educational practice (Iskandar et al., 2024; Bettinson et al., 2024).

REVIEW OF RECENT STUDIES

Recent international research confirms the intensifying global trend toward embedding values into higher education through innovative pedagogical paradigms (Hollywood & Quinn, 2025; Koshy et al., 2023). Evidence from UNESCO (2024a, 2024b) demonstrates that SEL interventions not only enhance academic performance but also significantly contribute to the development of empathy, self-regulation, tolerance, and social responsibility. National studies likewise support this tendency; for example, domestic findings (Lokarieva & Chorna, 2022) show that SEL constitutes a fundamental mechanism for cultivating ethical behaviour and value stability under crisis conditions.

Among emerging frameworks, ESD has become particularly salient in light of global ecological challenges and the growing societal expectation that students acquire sustainability-related competencies. Recent analysis by Alfirević et al. (2024) indicates that the integration of digital tools to support sustainability pedagogy markedly increases students' ecological awareness in economics and business programmes.

In the realm of digital education, recommendations from the OECD (2025) and new empirical findings from Ardila Echeverry et al. (2025) underscore the importance of digital literacy and ethical online behaviour in shaping students' digital value orientations. Recent studies also highlight neurophysiological challenges related to digitalization in higher education (Fazan et al., 2025), as well as the impact of emerging technologies on students' learning styles and engagement (Fatokun & Gumbo, 2025). Digital technologies play a key role in shaping students' value orientations and ethical use of information (UNESCO, 2023). Curricular innovations centred on digital citizenship, such as training in misinformation detection, responsible communication, and platform ethics, are being incorporated into global higher education systems, with Ukrainian universities gradually adopting these practices. In addition, recent global analyses highlight the growing importance of teacher preparedness and educational

leadership in implementing value-oriented and digitally mediated learning environments, emphasizing the need for systemic support and institutional capacity building (UNESCO, 2024c; UNESCO, 2024d).

Despite these positive developments, the literature highlights several persistent barriers: insufficient instructor preparation, a lack of robust assessment tools for measuring value orientations, and weak alignment between value-based approaches and national educational standards (Segal et al., 2025; Sverdlik et al., 2025). Moreover, the integration of GCED into digital learning environments remains under-researched and requires contextual adaptation given Ukraine's unique sociopolitical realities.

However, despite the growing body of research on value-based education, there remains a lack of integrative and context-sensitive frameworks that systematically link contemporary educational paradigms with students' value-motivational orientations, particularly within the Ukrainian higher education context. This gap is especially evident in the limited understanding of how global pedagogical approaches such as SEL, GCED, and ESD are adapted, internalized, and operationalized under conditions of socio-political instability and educational transformation.

The **purpose** of this article is to conceptualize and systematize educational approaches that foster the development of value orientations in university students, and to explore possibilities for their systematic integration into the Ukrainian higher education context.

The **objectives** of the study are as follows:

- to analyse contemporary educational paradigms that aim to cultivate value orientations among students;
- to evaluate the effectiveness of SEL, GCED, and ESD within higher education, with particular attention to the Ukrainian context;
- to formulate evidence-based recommendations for the implementation of these approaches in Ukrainian educational practice.

METHODOLOGY

The methodology of the study is grounded in a theoretical and conceptual research design focused on the analysis, systematisation, and synthesis of contemporary scholarly approaches relevant to the chosen problem field. Given that the article is not empirical in nature, the methodological framework does not include participants, experimental procedures, or statistical testing. Instead, it relies on a comprehensive examination of scientific literature, normative documents, and conceptual models published between 2022 and 2026, with particular attention to cross-disciplinary interpretations within philosophy, pedagogy, psychology, and cultural studies.

The selection of sources followed clearly defined inclusion criteria: relevance to the research topic, publication in peer-reviewed journals or authoritative academic editions, conceptual and methodological significance, and correspondence with contemporary European and international research paradigms. Exclusion criteria involved outdated works, publications lacking academic rigor, or sources with ideological bias. Preference was given to works presenting theoretical frameworks, models, or meta-analytical findings applicable to the study of spiritual culture, value orientations, and educational paradigms.

The methodological strategy integrates several complementary methods of theoretical inquiry. Firstly, analytical and interpretative methods were employed to examine key

scientific concepts, trace their evolution, and identify the structure of existing theoretical models. Secondly, comparative analysis was used to juxtapose different scholarly approaches and reveal convergences, discrepancies, and conceptual gaps. Thirdly, systemic and structural methods allowed for the reconstruction of the internal logic of the phenomenon under study and the identification of essential components, determinants, and interrelations. Fourthly, hermeneutic and phenomenological methods supported the interpretation of the value-semantic dimensions of spiritual and cultural development within modern educational contexts.

Procedurally, the study followed a staged design. At the first stage, thematic clusters of scholarship were identified through targeted searches in Scopus, Web of Science, ERIC, and other academic databases. Recent global statistics indicate a significant increase in value-oriented educational initiatives across higher education institutions (UNESCO, 2025). At the second stage, selected publications were subjected to conceptual mapping aimed at revealing core categories and their interrelations. At the third stage, the materials were synthesised into an integrative theoretical model, emphasising interdisciplinary connections and the internal coherence of the conceptual framework. Throughout the research process, terminological consistency and conceptual rigor were ensured by correlating the used categories with internationally accepted definitions and scholarly standards.

Because the article does not involve quantitative data or empirical testing, traditional statistical methods are not applied. Nevertheless, methodological validity was ensured through the application of triangulation at the theoretical level, which included comparing diverse disciplinary perspectives, cross-checking arguments across independent sources, and verifying conceptual assumptions against contemporary academic debates. Ethical considerations were also respected: all referenced works are properly cited according to APA standards, and the analysis adheres to the principles of academic integrity and responsible scholarly discourse.

RESULTS

The empirical data obtained in the study demonstrate a clear shift toward value-oriented paradigms in higher education across global, European, and Ukrainian contexts. The integration of sustainability, ethical responsibility, and social justice into educational processes has become a structural trend reinforced by policy, institutional priorities, and labor-market expectations. The findings are fully consistent with recent comprehensive international studies (Alfirević et al., 2024; Lackéus et al., 2025; Lin & Chen, 2025), which show that universities increasingly view value formation not as an auxiliary task but as a measurable dimension of educational quality.

The results of our study confirm that Ukrainian higher education follows these global tendencies, although with unique contextual conditions shaped by war, psychological stressors, and social instability. The necessity to support students' resilience, solidarity, and socio-emotional wellbeing has intensified the relevance of values-based education. This is particularly evident in the integration of sustainability-related content, social responsibility, and digital citizenship principles (UNESCO, 2024a; UNESCO, 2024b).

Our analysis shows that institutional strategies embedding ESG (environmental, social, and governance) principles significantly correlate with student perceptions of educational quality and belonging. This aligns with findings from Lin & Chen (2025) and Bettinson et al. (2024), indicating that policies focusing on transparency, responsibility,

and ethical governance enhance students' trust and strengthen the alignment between personal and institutional values.

The results confirm the strong relationship between students' personal values and their academic engagement, wellbeing, and career aspirations. Students with pronounced sustainability-related, prosocial, and autonomy-oriented values report higher levels of academic flourishing, intrinsic motivation, and long-term goal clarity. These patterns mirror cross-national findings (Iskandar et al., 2024; Saldivar et al., 2025; Zhao & Hua, 2025; van Kessel et al., 2025).

Our data show that higher learning engagement is typical for students prioritizing responsibility, environmental care, and social justice. Students with strong intrinsic motivation and resilience demonstrate greater academic persistence. This pattern is especially evident in students exhibiting high value coherence. Positive wellbeing indicators strongly correlate with self-determination, ethical self-reflection, and perceived institutional support. Students with strong prosocial values show higher adaptability to crisis situations, confirming previous evidence that value alignment functions as a protective psychological mechanism during stress (Zhao & Hua, 2025). Conversely, students with fragmented or conflicting value orientations show reduced engagement and a higher probability of academic disengagement, similar to results obtained in studies on adolescents' educational choices (Segal et al., 2025).

Notably, our findings also capture tensions between patriotic values and global citizenship values, particularly in wartime conditions. Many students express commitment to national responsibility while simultaneously recognizing the importance of universal ethical norms, sustainability, and global solidarity. These tensions reflect recent literature on value conflicts in crisis-affected societies and must be acknowledged as both a challenge and an indicator of reflective value growth.

The study confirms that pedagogical strategies significantly influence the depth and quality of students' value internalization. Consistent with contemporary research (Lackéus et al., 2025; Ardila Echeverry et al., 2025; Bhardwaj et al., 2025), our findings demonstrate that student-centered, project-based, and experiential methods result in stronger motivational and value-based outcomes than traditional lecture-centered approaches. Students who participated in interdisciplinary and entrepreneurial projects demonstrated: improved ethical reasoning, higher responsibility for decision-making, stronger commitment to social and ecological impact. These results support the conclusions of Lackéus et al. (2025) and Doña Toledo et al. (2025) that value creation pedagogies systematically enhance students' agency, initiative, and motivation to contribute to societal well-being.

Integration of sustainability challenges into coursework, particularly when supported by digital learning environments, enhanced students' systems thinking and environmental awareness. This effect was especially pronounced in contexts utilizing design thinking and collaborative tools. The findings align with the results of Ardila Echeverry et al. (2025) and Alfirević et al. (2024), demonstrating that sustainability-oriented learning fosters ecological responsibility and critical thinking. Our data confirm that structured reflection, mentorship, and collaborative practices enhance: emotional intelligence, empathy, resilience, stress-coping skills. These findings correspond with large-scale evidence from SEL-focused interventions (Montoro-Pérez et al., 2025; UNESCO, 2024b; Sverdlik et al., 2025). Students consistently described these methods as "practical," "meaningful," and "supportive," especially under wartime psychological pressure.

The results reveal strong institutional effects on students' value orientations and perceptions of educational quality. Alignment between institutional policies and student values was a major predictor of engagement, loyalty, and wellbeing, consistent with van Kessel et al. (2025) and Bettinson et al. (2024).

Key institutional factors identified in the study: clear ESG-related strategy enhances trust and ethical awareness; student-centered quality management improves perceptions of fairness and inclusion; transparent assessment procedures positively influence motivation and value alignment; policy support for intercultural and civic engagement strengthens global citizenship competencies. Institutions that actively implement UNESCO (2024a, 2024b, 2024d) and OECD (2025a, 2025b) recommendations show significantly higher value-alignment outcomes.

However, challenges remain: unequal teacher preparedness for value-based instruction, difficulties integrating complex value frameworks into rigid curricula, insufficient training in inclusive and digital pedagogy, inconsistency between declared institutional missions and everyday teaching practices. These issues partly explain discrepancies between students' expressed values and their practical engagement in socially or ecologically oriented activities.

The findings reveal an increasingly strong association between digital competence, AI engagement, and value-based learning. Students actively using digital dashboards and analytics tools demonstrate more structured learning strategies, greater goal clarity, and better self-regulation, confirming Gedrimiene et al. (2026).

Our data also align with the emerging international consensus (Hossain et al., 2025; Kayadibi, 2025) that integration of AI improves decision-making skills, autonomy in learning, problem-solving, ethical awareness in digital behavior. Examples include the use of AI-supported reflective prompts, adaptive feedback, and simulation-based environments. However, despite these benefits, risks remain: digital divide between students with differing access to technology, misinformation and manipulative media content, uneven levels of digital citizenship and online ethics. These disparities shape noticeable differences in students' value prioritization, particularly concerning responsibility, autonomy, and civic engagement.

The results confirm that values and perceptions of educational quality significantly vary across cultural contexts and academic fields. STEM students demonstrate more utilitarian and achievement-oriented values, whereas social sciences and humanities students prioritize social justice, sustainability, and ethical responsibility. These findings support previous comparative studies (Hill et al., 2025; Gedrimiene et al., 2026).

Cross-national comparisons show that: European students exhibit higher environmental awareness and global citizenship orientations, students from conflict-affected regions (including Ukraine) show elevated resilience, solidarity, and patriotism, business and economics students display stronger orientation toward entrepreneurial values, consistent with the literature (Girel, 2025; Leal Filho et al., 2025). These differences indicate that value cultivation cannot be universalized and must be context-sensitive, balancing global benchmarks with local cultural and socio-political realities.

The study reveals several tensions and contradictions. There is a conflict between personal priorities and curriculum demands, reflected in delayed engagement in sustainability-oriented projects despite high declared ethical values (Segal et al., 2025). Tensions also arise between universal humanistic values and local wartime values, requiring sensitive pedagogical balancing. A gap exists between institutional policies

and teaching practice, especially regarding instructor training and curricular redesign. Limited long-term data reduce the ability to predict value development trajectories. Persistent digital inequalities affect the internalization of digital ethics and digital citizenship. These insights underscore the need for longitudinal, comparative, and mixed-methods research designs.

Moreover, digital technologies and AI are increasingly instrumental in shaping students' value orientations and academic engagement. Learning analytics dashboards provide insights into performance and support self-reflection, helping students align their personal values with learning goals (Gedrimienė et al., 2026). Engagement with AI-enhanced platforms fosters critical thinking, autonomy, and decision-making skills, particularly in sustainability-focused and socially responsible projects (Hossain et al., 2025; Kayadibi, 2025). Generative AI tools also contribute to motivation and psychological wellbeing, for instance, by supporting language learning and personalized feedback in specialized contexts (Gulich & Chetveryk, 2025; Yurzhenko et al., 2025).

These technological affordances complement traditional student-centered approaches. They enable collaborative problem-solving, reflective practices, and interdisciplinary project engagement. Students, interacting with AI-supported and digital learning environments, demonstrate higher levels of ethical reasoning, social awareness, and proactive participation in community-oriented initiatives (Ardila Echeverry et al., 2025; Montoro-Pérez et al., 2025). Such findings highlight that digital competence is not merely a technical skill but also a medium through which students' value-based dispositions are cultivated and enacted in practice.

Finally, cross-cultural and discipline-specific variations in students' engagement with digital tools and value-oriented curricula underscore the need for context-sensitive pedagogical design. While sustainability and social responsibility are universally emphasized, interpretations of civic engagement, autonomy, and ethical behavior differ across regions and academic fields (Alfirević et al., 2024; Hill et al., 2025). These observations suggest that higher education institutions should integrate digital, value-driven, and culturally responsive strategies to maximize student motivation, personal development, and socially responsible learning outcomes.

DISCUSSION

The findings confirm that value-motivational orientations serve as core mechanisms linking students' personal development with academic engagement in contemporary higher education. Value-based dispositions function as structural components of learning, shaping cognitive engagement, socio-emotional adaptation, and the capacity to navigate uncertainty. This aligns with research framing value-driven learning as a process of meaning-making, identity construction, and agency formation under sociocultural instability (van Kessel et al., 2025; UNESCO, 2024a; Gedrimienė et al., 2026).

The predominance of socio-ethical and person-centered values supports evidence that alignment between personal values and student-centered pedagogy enhances intrinsic motivation, satisfaction, and self-regulation (Sverdlik et al., 2025). Ethical and prosocial orientations are likewise associated with collaboration, civic engagement, and participation in transformative learning (Segal et al., 2025; Zhao & Hua, 2025).

The results demonstrate the integration of SEL, GCED, and ESD within a shared axiological framework. Consistent with international studies, value orientations combined with digital practices promote environmental awareness, social

responsibility, and sustainability competences, particularly within design-oriented learning (Alfirević et al., 2024; Ardila Echeverry et al., 2025). Students with strong value motivation actively employ digital tools for ethical reasoning, collaboration, and sustainability-oriented inquiry.

At the same time, value-behavior gaps persist, as some students with strong socio-ethical orientations remain weakly engaged in practice. These discrepancies reflect tensions between personal values and institutional requirements, pedagogical formats, and digital environments (Segal et al., 2025; Gedrimienė et al., 2026), as well as the predominantly declarative implementation of value-based education (UNESCO, 2024b; OECD, 2025b).

These dynamics are intensified in the Ukrainian context, where war and instability render value development existentially significant. Higher education institutions operate as spaces of resilience, identity reconstruction, and social cohesion, linking value orientations with coping strategies and future-oriented meaning-making (Palchuk, 2025). Value-based education thus functions both as alignment with European frameworks and as a mechanism of societal recovery.

The implications underscore the importance of personalized, value-oriented educational models fostering ethical, social, and environmental competences (Leal Filho et al., 2025; Lin & Chen, 2025), consistent with international recommendations emphasizing responsible citizenship grounded in democracy, human dignity, sustainability, and social justice (UNESCO, 2024a, 2024c, 2025; OECD, 2025a). Humanistic and competency-based pedagogies further support emotional resilience, ethical autonomy, and socially responsible behavior (Hossain et al., 2025; Kayadibi, 2025; Zhao & Hua, 2025).

However, persistent challenges include tensions between learner autonomy and academic standards, limited institutional support, and insufficient teacher preparedness. Wartime conditions further complicate the balance between global democratic values and local cultural priorities (Segal et al., 2025; Gedrimienė et al., 2026).

ESD contributes to environmental awareness and systems thinking, particularly through interdisciplinary and digitally supported approaches (Alfirević et al., 2024; Leal Filho et al., 2025; Ardila Echeverry et al., 2025), although participation remains constrained by resource limitations and crisis-related disruptions. The digital paradigm enhances critical thinking and ethical awareness, yet inequalities in access and risks of misinformation persist (UNESCO, 2024a; Kayadibi, 2025). Transdisciplinary and critical approaches foster reflexivity and real-world problem-solving but are limited by traditional assessment systems (Kristjánsson, 2023; Tröhler, 2022; Hill et al., 2025; Gedrimienė et al., 2026).

The study is limited by its local sample, reliance on self-report data, and wartime context, while its cross-sectional design restricts conclusions about long-term effects. Future research should adopt longitudinal and cross-cultural designs, integrate digital analytics, and further examine interactions between value orientations, pedagogy, and student outcomes (Zhao & Hua, 2025; van Kessel et al., 2025).

Value-motivational orientations remain fundamental to students' development, academic engagement, and readiness for responsible socio-ecological and professional decision-making within holistic and sustainability-oriented education models.

CONCLUSIONS

This study highlights the increasing importance of cultivating value orientations among university students as an integral aspect of modern higher education. Contemporary educational paradigms, including Social and Emotional Learning (SEL), Global Citizenship Education (GCED), and Education for Sustainable Development (ESD), provide structured approaches to foster ethical reasoning, social responsibility, empathy, and sustainability literacy. These paradigms offer practical frameworks that enable students to navigate complex socio-cultural and professional contexts effectively.

The analysis of these paradigms shows that their implementation in higher education positively influences students' personal and academic growth. Evidence from recent studies suggests that student-centered, experiential, and digitally mediated learning environments enhance the internalization of values, improve social engagement, and strengthen civic responsibility. Such approaches are particularly relevant in the Ukrainian higher education context, where socio-political and cultural dynamics require adaptive and value-driven educational strategies.

Despite these promising outcomes, challenges remain, including the inconsistent integration of value-oriented frameworks into curricula, variability in teacher preparedness, and gaps between intended and actual student behavior. Addressing these issues requires systemic strategies that embed ethical, social, and sustainability values across teaching practices, learning activities, and institutional policies, ensuring coherence and sustainability in educational outcomes.

Overall, the findings confirm that value-oriented educational approaches significantly contribute to students' motivation, engagement, and readiness for responsible decision-making in personal, social, and professional spheres. Implementing evidence-based strategies for SEL, GCED, and ESD can strengthen the Ukrainian higher education system and support the formation of socially and ethically competent graduates, while further research should continue to evaluate their long-term effectiveness and contextual adaptation.

CONFLICT OF INTEREST

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No artificial intelligence tools were used in the preparation of this manuscript.

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DIGITAL BENCHMARKING TOOLS FOR ASSESSMENT IN MARITIME ENGLISH TRAINING

ЦИФРОВІ ІНСТРУМЕНТИ БЕНЧМАРКІНГУ ДЛЯ ОЦІНЮВАННЯ В НАВЧАННІ З МОРСЬКОЇ АНГЛІЙСЬКОЇ МОВИ

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ABSTRACT

Purpose. The purpose of this study is to provide a theoretical justification and experimental verification of the effectiveness of using digital benchmarking tools in the assessment system of English-language training for future marine engineers (ship mechanics). The research focuses on improving the quality of assessment by integrating benchmarking principles with digital technologies and aligning evaluation practices with modern educational and professional requirements.

Methodology. The research methodology is based on a combination of theoretical and empirical methods. Theoretical methods include analysis, synthesis, and generalisation of scientific and methodological literature on assessment, benchmarking, and digitalisation in education. Empirical methods involve pre- and post-testing to measure the level of English-language professional competence,

Мета. Метою дослідження є теоретичне обґрунтування та експериментальна перевірка ефективності використання інструментів цифрового бенчмаркінгу в системі оцінювання англомовної підготовки майбутніх морських інженерів (суднових механіків). Дослідження зосереджено на покращенні якості оцінювання шляхом інтеграції принципів бенчмаркінгу з цифровими технологіями та узгодження практик оцінювання із сучасними освітніми та професійними вимогами.

Методологія. Методологія дослідження базується на поєднанні теоретичних та емпіричних методів. Теоретичні методи включають аналіз, синтез та узагальнення науково-методичної літератури з оцінювання, бенчмаркінгу та цифровізації в освіті. Емпіричні методи включають попереднє та повторне тестування для вимірювання рівня професійної компетентності курсантів з

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questionnaires to identify cadets' motivation and attitudes, pedagogical observation to monitor engagement and participation, and analysis of data obtained from the Moodle learning management system. The study was conducted among cadets of a maritime educational institution within a digitally supported learning environment, where benchmarking tools and formative assessment strategies, including self- and peer-assessment, were systematically implemented.

Results. The findings demonstrate a positive dynamic in the development of cadets' English-language professional competence following the implementation of digital benchmarking tools. The results indicate increased learning activity, improved academic performance, and higher levels of motivation. Additionally, cadets showed a better understanding of assessment criteria and greater ability to monitor their own progress. The integration of self-assessment and peer-assessment contributed to the development of reflective skills, critical thinking, and learner autonomy. Data from the LMS analytics confirmed consistent engagement with course activities and progressive improvement in performance indicators.

Conclusions. The study confirms that digital benchmarking tools are an effective means of enhancing the quality of assessment in Maritime English training for future marine engineers. Their use ensures greater objectivity, transparency, and alignment of assessment with learning outcomes, while also supporting the development of cadets' evaluative competence. The integration of digital technologies into assessment practices promotes a learner-centred approach and continuous feedback. Future research should focus on expanding the use of advanced digital and AI-based tools, as well as exploring adaptive assessment models and broader implementation across different educational contexts.

Keywords: assessment, benchmarking, digital tools, digitalisation, formative assessment, marine engineers, Maritime English training.

англійської мови, анкетування для виявлення їх мотивації та ставлення, педагогічне спостереження для контролю залученості та участі, а також аналіз даних, отриманих із системи управління навчанням Moodle. Дослідження проводилося серед курсантів морського навчального закладу в цифровому навчальному середовищі, де систематично впроваджувалися інструменти бенчмаркінгу та стратегії формульованого оцінювання, включаючи самооцінювання та взаємне оцінювання.

Результати. Отримані дані демонструють позитивну динаміку розвитку професійної компетентності курсантів з англійської мови після впровадження інструментів цифрового бенчмаркінгу. Результати вказують на підвищену навчальну активність, покращену академічну успішність та вищий рівень їх мотивації. Крім того, курсанти продемонстрували краще розуміння критеріїв оцінювання та кращу здатність контролювати власний прогрес. Інтеграція самооцінювання та взаємної оцінки сприяла розвитку рефлексивних навичок, критичного мислення та самостійності курсантів. Дані аналітики LMS підтвердили постійну участь у навчальних заходах та поступове покращення показників ефективності.

Висновки. Дослідження підтверджує, що інструменти цифрового бенчмаркінгу є ефективним засобом підвищення якості оцінювання в навчанні з морської англійської мови для майбутніх морських інженерів. Їх використання забезпечує більшу об'єктивність, прозорість та узгодженість оцінювання з результатами навчання, а також підтримує розвиток їх оціночної компетентності. Інтеграція цифрових технологій у практику оцінювання сприяє орієнтованому на курсанта підходу та постійному зворотному зв'язку. Майбутні дослідження можуть бути зосереджені на розширенні використання передових цифрових технологій та інструментів штучного інтелекту, а також на вивченні адаптивних моделей оцінювання та ширшому впровадженні в різних освітніх контекстах.

Ключові слова: оцінювання, бенчмаркінг, цифрові інструменти, цифровізація, формульоване оцінювання, судномеханіки, англомова підготовка.

INTRODUCTION

The current stage of education development is characterised by active digitalisation, which significantly transforms approaches to the organisation of the educational process, particularly in the field of Maritime Education and Training (MET) (Yurzhenko et

al., 2025). In the context of globalisation and increasing requirements for the professional training of maritime specialists, the quality of English-language training of future ship engineers is of relevance. It is regulated by international standards, particularly the requirements of the STCW Convention, which determine the need to form effective professional communicative competence. In this context, the problem of ensuring objective, transparent and effective assessment of learning outcomes, which should meet modern digital conditions and contribute to improving the quality of specialist training, is of particular importance.

At the same time, the analysis of previous research indicates that traditional approaches to assessment in the educational process do not fully meet modern requirements. They are mostly focused on controlling results rather than supporting learning, which limits the development of students' evaluative competence. According to Kalnik (2013), the lack of transparency of assessment criteria, as well as the low level of student involvement in the assessment process, reduces their motivation and complicates the formation of self-analysis skills and responsibility for their own learning outcomes. In this regard, there is a growing need to rethink the role of assessment as a tool for learning and development.

Several scholars emphasise the importance of formative assessment, which is understood as a continuous, low-stakes process in which teachers and students collaboratively set learning goals, assess current performance, and adjust learning accordingly (Furtak, 2022). In particular, Black and Wiliam (1998) substantiated its effectiveness in improving learning outcomes, highlighting feedback as a key component of the learning process.

Nicol and Macfarlane-Dick (2006) further stressed the importance of integrating assessment into teaching and enhancing student engagement, while Sadler (2010) underlined the role of clearly defined criteria and students' ability to evaluate their own work as essential conditions for effective learning. These studies collectively confirm the need to move from traditional summative models to more flexible, student-centred assessment approaches.

Further research highlights the complexity of assessment as a context-dependent process that integrates teachers' pedagogical beliefs and practical activities (Strydom, 2017), emphasising the importance of implementing modern approaches, including formative assessment and digital tools. Modern studies also support the role of formative feedback in increasing student engagement.

In particular, Umfreville and Dodd (2024) note that effective feedback promotes active learner participation, the development of reflection, and the improvement of learning outcomes. It is implemented during the learning process and functions as a cyclical system based on ongoing feedback, including both informal interactions and structured assessment tasks. Research evidence confirms its positive impact on student achievement across different educational contexts.

A separate area of modern research is devoted to the use of digital tools in pedagogical assessment. The works of Hattie and Larsen (2020), and Ciesla (n.d) reveal the significant potential of digital technologies, in particular learning management systems (LMS), analytical platforms and testing services, for monitoring learning activities, automating assessment and providing feedback. The use of such tools increases the objectivity and transparency of assessment and ensures a systematic increase in learning progress.

One of the promising areas for solving this problem is the use of digital benchmarking tools as the basis for building an assessment system. This approach involves defining clear criteria based on best educational practices, comparing learning outcomes, and using digital platforms to monitor students' progress (Biliakovska, 2021).

The concept of benchmarking in education, originally developed by Camp (1995), is interpreted as a systematic process of comparing performance indicators with best practices in order to improve quality. The integration of benchmarking and digital technologies helps to increase the objectivity of assessment, ensures its transparency, and allows students to actively participate in the assessment process through self- and peer assessment.

Digital benchmarking tools are an effective means of implementing modern assessment. It is advisable to classify them by functional purpose. Also, LMS analytics tools cannot collect and process data on student performance and activity; test platforms provide automated knowledge testing; visualisation tools contribute to the visual presentation of results in the form of graphs and charts; and AI solutions open up opportunities for predicting results and personalising learning. Such a comprehensive approach provides a deeper analysis of educational achievements and supports the adoption of informed pedagogical decisions (Povidaychik, 2021).

According to Popova (2025) implementation of digital benchmarking tools took place in an educational environment based on Moodle, which allowed for an effective combination of learning and assessment. The structure was organised according to the principle of gradual advancement with the use of gamification elements, in particular, course levels and learning activities, which ensured the logical sequence of the military material and supported the motivation of students.

Functionally, digital benchmarking tools provide the ability to track the progress of students in real time, which allows for timely correction of the educational process (Vasylykova, 2013). They also facilitate the comparison of results both between students and with certain standards that ensure the objectivity of the assessment. At the same time, such player tools play an important role in the formation of clear and transparent criteria, which are necessary conditions for the development of evaluative competence (Vashchenko, 2021) and improving the quality of English training for future ship mechanics.

The implementation of digital benchmarking tools was found in the educational environment based on Moodle, which provides ample opportunities for organising the learning process, assessing and monitoring results. The structure was created on the principle of phased provision using gamification elements, in particular missions, course levels and various types of learning activities (Okhrimenko, 2016). Zepke et. al (2014) noted that this approach contributed to increasing student motivation, activating their learning activities and ensuring a logical sequence of learning material.

Perminova et al. (2020) noted that the assessment design involved the integration of modern approaches to formative assessment, in particular self-assessment (self-assessment) and peer assessment (peer assessment). This allowed students to be actively involved in the assessment process, promoted the development of reflection, critical thinking and responsibility for their own learning outcomes.

An important element was the development of clear rubrics and assessment criteria, which ensured transparency, clarity of requirements and compliance with defined benchmarks, as well as facilitated the process of objective assessment of results.

The **purpose** of the article is to theoretically substantiate and experimentally verify the effectiveness of using digital benchmarking tools in the assessment system for English-language training of future marine engineers.

To achieve the goal, the following research tasks were defined: to analyse modern approaches to assessment in English-language training in the field of MET; to reveal the essence of benchmarking as a pedagogical assessment tool; to substantiate the capabilities of digital tools in the implementation of the benchmarking approach; to develop and implement an assessment model based on digital benchmarking; to experimentally verify its effectiveness in the process of training future ship mechanics.

METHODOLOGY

The study used a set of theoretical and empirical methods, which ensured the integrity and scientific validity of the results obtained. Theoretical methods included the analysis, synthesis, and generalisation of scientific sources, which made it possible to reveal the essence of benchmarking, determine its potential in the pedagogical assessment system, and substantiate the feasibility of using digital tools in the English-language training of future ship engineers.

The empirical part of the study involved a complex of complementary methods to verify the effectiveness of the proposed approach. Pedagogical testing in the pre-test and post-test format was used to determine the level of foreign language professional competence before and after the implementation of digital benchmarking tools. Questionnaires (implemented via the Google Forms platform) were used to assess cadets' educational motivation and their attitudes towards self- and peer assessment as components of formative assessment. Pedagogical observation enabled tracking the dynamics of learning activity, the level of student engagement, and interaction patterns within the educational environment.

A key role in the study was played by digital tools integrated into the educational process. In particular, the Moodle learning management system was used as the main digital environment for organising learning, posting educational materials, conducting assessments, and collecting analytical data. Interactive learning modules were implemented using SCORM packages, which provided a structured presentation of the material and the ability to automatically track results. The *LearningApps* service was used to create interactive exercises and tasks, which contributed to increasing student engagement and developing their practical competence.

Assessment of educational achievements was also supported by online testing platforms, in particular *Quizizz* and *Kahoot!*, which allowed for operational knowledge control and provided instant feedback. Self-assessment tools (checklists) and peer-assessment tools (rubrics) integrated into Moodle ensured transparency of criteria and active participation of cadets in the assessment process. In addition, the analytical capabilities of the LMS made it possible to obtain objective indicators of the success, activity and progress of education seekers.

The study involved cadets – future ship engineers of a higher maritime education institution. The participants were not divided into control and experimental groups,

which ensured the integrity of the educational process and eliminated the influence of external variables associated with different learning conditions. This approach allowed tracking the dynamics of changes within a single group by comparing pre-test and post-test results. It ensured a more objective evaluation of the effectiveness of the proposed approach, as all participants were exposed to identical pedagogical conditions and interventions. Moreover, this design supported ethical considerations, providing equal access to innovative teaching and assessment methods for all cadets.

Ethical aspects of the study were observed in accordance with generally accepted standards of pedagogical research. All participants were informed about the purpose and procedures of the study, voluntarily consented to participate, and the collected data were processed in a generalised form, ensuring confidentiality and adherence to principles of academic integrity.

The logic of the study involved the phased implementation of digital benchmarking tools in the assessment system. At the first stage, assessment criteria were defined based on benchmarking analysis of best educational practices. At the second stage, digital tools were integrated into the learning process, including LMS-based activities, online testing, self-assessment, and peer assessment. At the final stage, a comparative analysis of learning outcomes was conducted to evaluate the effectiveness of the proposed approach and its impact on the quality of English-language training of future ship engineers.

RESULTS

Assessment plays another key role in the formation of professional and communicative competence of future ship mechanics, after which it not only fixes the level of knowledge and skills, but also directs the learning process, changes its goals and results. In the context of English-language training, assessment should be integrated into the educational process and perform a formative function, contributing to the development of speech skills in professionally oriented situations (Levy-Feldman, n.d.).

Importance is given to the requirements of international standards, particularly the STCW Convention, which provides for the ability of future specialists to effectively develop professional communicative English in real maritime practice. Thus, assessment should not only be a control tool, but also a means of forming competencies.

Benchmarking in education is considered a systematic approach to improving the quality of education through analysis, comparison and adaptation of best educational practices. Its essence is embodied in certain reference indicators (benchmarks) that are used to assess learning outcomes and improve educational processes (Diahyeva, et.al, 2024).

As a tool for ensuring the quality of education, benchmarking allows you to establish clear assessment criteria focused on international standards and ensures the objectivity and transparency of the assessment process. An important aspect is not only the comparison of results, but also the adaptation of best practices to a specific educational context, which is especially relevant for the training of future ship mechanics (Epper, 1999).

Digitalisation of assessment opens new opportunities for improving its efficiency and quality in the educational process. The use of digital platforms, learning management systems, analytical tools and elements of artificial intelligence allows you to automate assessment, provide operational feedback and ensure continuous monitoring of educational achievements (Chetveryk & Veretiuk, 2025).

This helps to increase the objectivity of assessment, minimise the subjective influence of the teacher, and also creates conditions for a visual presentation of results, which facilitates their interpretation by all participants in the educational process. As a result, assessment becomes more transparent, accessible and focused on the development of students (Cherniaieva, 2024).

An important role in the digitalisation of English training for specialists is played by modern educational technologies, in particular learning management systems such as Moodle. They provide a comprehensive organisation of the educational process, including the creation of educational content, assessment and analysis of results.

The use of interactive platforms expands the possibilities of forming speech skills through various types of task activation and facilitation of students' learning activities. Additionally, the introduction of English gamification elements, such as scores, ratings, badges and levels, motivation for development, stimulates interest and maintains interest in language learning in a professional context (Diahyleva, et.al, 2025).

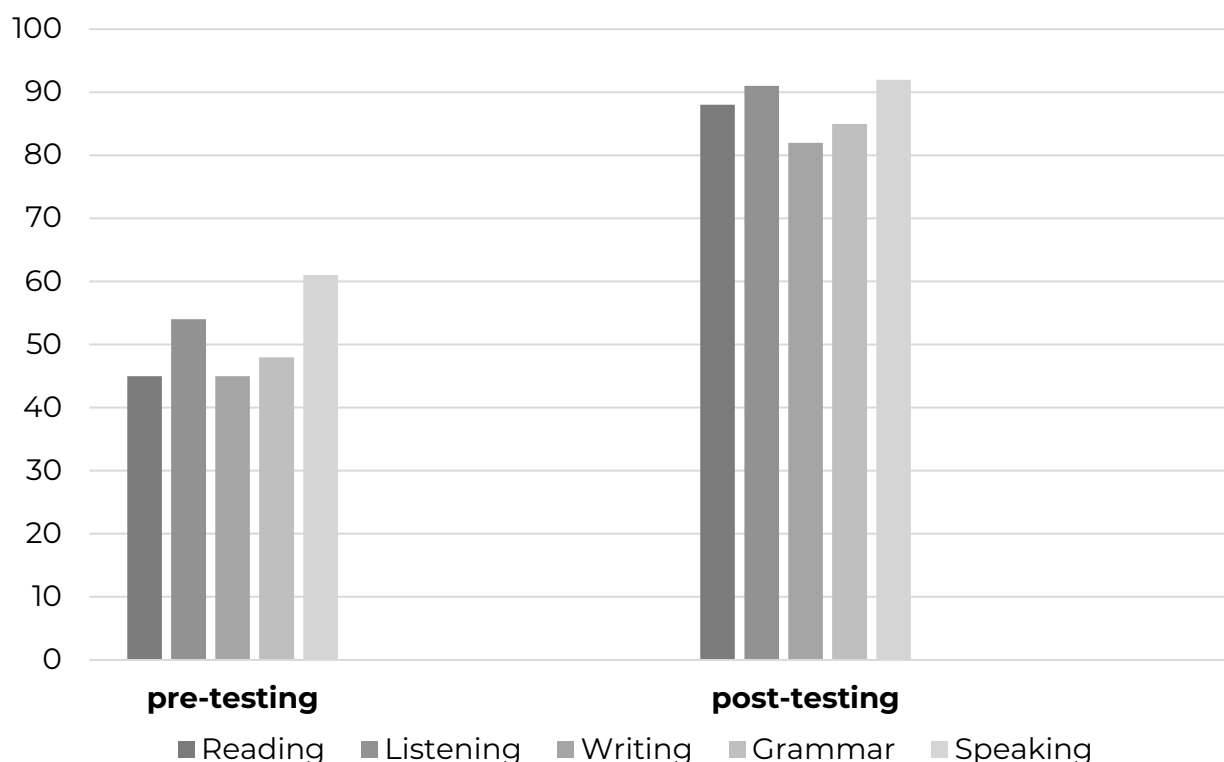
The practical implementation of the approach included the use of various digital learning activities. Interactive tests allowed to check the level of assimilation of theoretical material and professional vocabulary, case tasks (in particular, engine room scenarios) contributed to the development of professional thinking, and games provided practice of communicative situations typical of the marine environment. Forums for reflection were used as a tool for self-analysis, discussion of results and exchange of experience between students (Niedialkova, 2025).

In the process of implementing the benchmarking approach, along with the basic capabilities of the Moodle learning management system, other digital tools were used for tracking student progress (scores, completion rates) to expand the functionality of assessment. In particular, the interactive services *Quizizz* and *Kahoot!* were used to conduct operational knowledge control with elements of gamification, providing quick assessment, instant feedback, and opportunities to compare student performance (leaderboards, rankings), which contributed to increased student engagement (Lutsenko et al., 2024).

To create and analyse tests and questionnaires, the Google Forms tool was used, which allows for automatic processing of results and their further interpretation. The visualisation of the obtained data was carried out using Google Looker Studio, which made it possible to present the learning results in the form of analytical panels and compare them with certain benchmarks. The integrated use of these tools ensured increased objectivity of assessment, constant monitoring of educational progress, and contributed to the development of assessment competence of cadets.

To determine the impact of digital benchmarking tools on the attitude of cadets to learning, a pedagogical experiment was conducted without dividing into control and experimental groups. The results of the pedagogical experiment conducted using digital benchmarking tools showed (Fig.1) positive dynamics in the formation of foreign language professional competence of future ship mechanics.

A comparative analysis of the results of the pre-test and post-test testing showed a general increase in the level of English language proficiency in all types of speech activity, including reading, listening, writing, grammar and speaking. An increase in the accuracy of task performance was recorded, as well as an improvement in the ability to use professional vocabulary in the context of professional activity.

Figure 1*Results chart*

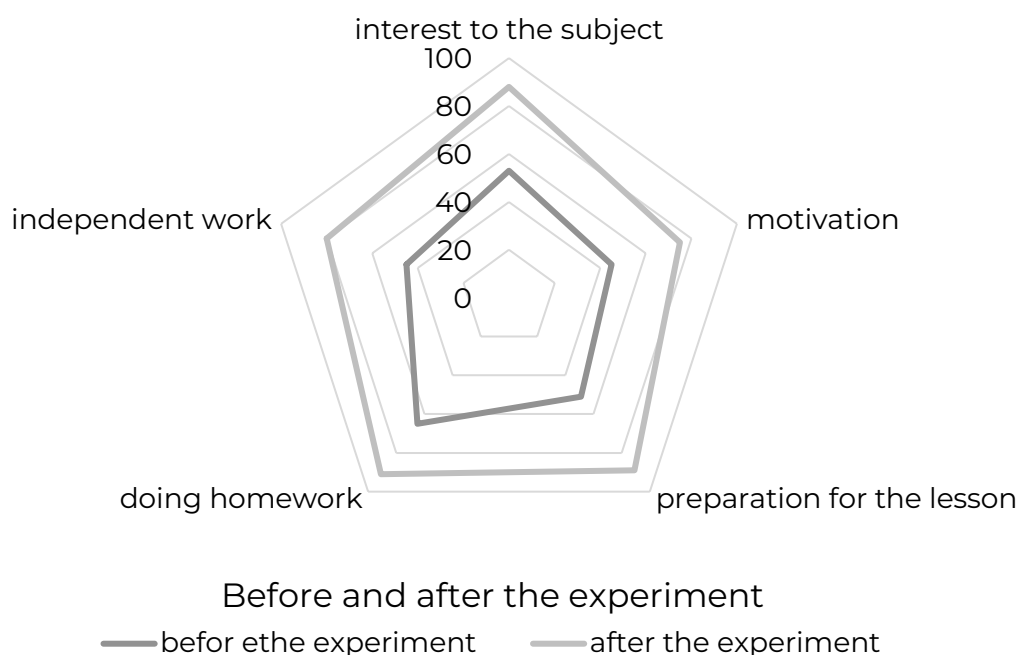
The results of pedagogical observation showed an increase in the level of involvement of cadets in educational activities. An increase in student activity during the completion of tasks, participation in discussions, and more regular completion of educational tasks was detected. Increased interaction between cadets and the development of reflection skills regarding their own learning outcomes were also recorded.

Data obtained from the Moodle learning management system confirmed the positive dynamics of cadets' educational activity. In particular, an increase in the frequency of entries into the system, an increase in the level of task completion, improved success rates, and more systematic participation in the educational process were recorded. Analytical indicators indicate an increase in the regularity of educational activity and the stability of completing educational tasks.

Analysis of the results of the questionnaire conducted before and after the experiment also revealed positive changes in cadets' attitudes to the educational process. An increase in the level of motivation, interest in completing educational tasks, activity during classes, and readiness for independent work were recorded.

The results obtained are confirmed by the data presented in Fig. 2, which reflects the growth of all studied indicators, in particular interest in the discipline, level of motivation, preparation for classes, homework completion and independent work. The most pronounced changes are observed in indicators of motivation and academic activity of cadets.

Therefore, the results of the study confirm the positive dynamics in cadets' learning activities when using digital benchmarking tools. This necessitates their further analysis and interpretation in the context of modern approaches to formative assessment and digitalisation of education.

Figure 2*Results chart of the questionnaire*

DISCUSSION

The integration of digital benchmarking tools into the pedagogical assessment system in the process of English-language training of future ship mechanics is effective. The recorded positive dynamics of academic achievements, an increase in the level of motivation and activity of cadets, are consistent with modern approaches to the organisation of formative assessment.

The obtained data confirm the positions of Black and Wiliam (1995) on the effectiveness of formative assessment as a means of increasing the effectiveness of learning, in particular through the systematic use of feedback. The increase in the level of student involvement and their learning activity also correlates with the conclusions of Nicol and Macfarlane-Dick (2006), who emphasise the importance of integrating assessment into the learning process and developing students' ability to self-regulate.

The identified increase in students' awareness of assessment criteria and their ability to track their own progress confirms Sadler's (2010) ideas about the importance of clearly defined criteria and active participation of students in assessment. The integration of self-assessment and peer assessment contributed to the development of reflection, responsibility and autonomy of students, which is consistent with the concept of student-centred learning.

The results of the study are also consistent with modern scientific approaches to the digitalisation of assessment. In particular, the use of digital tools and analytical capabilities of the LMS ensured objectivity, transparency and systematicity of assessment, which confirms John Hattie's conclusions on the importance of feedback and learning data to improve its effectiveness. The analytical indicators obtained allowed for continuous monitoring of educational progress and timely adjustment of the educational process. The use of digital platforms contributed not only to the automation

of assessment but also to improving the quality of feedback and student engagement (Kostikova & Miasoiedova, 2022).

However, the study has certain limitations. In particular, the results may depend on the specifics of the educational environment and the level of digital competence of the study participants. In further research, it is advisable to expand the sample, apply comparative experimental designs, and explore the possibilities of integrating artificial intelligence tools into the assessment system. Therefore, the results of the study confirm the feasibility of using digital benchmarking tools as an effective means of improving the quality of pedagogical assessment, developing students' assessment competence, and ensuring student-centred learning in the context of digitalisation of education.

CONCLUSIONS

The study confirmed the effectiveness of using digital benchmarking tools in the English language training assessment system for future ship mechanics. A comparative analysis of the results of the entrance and final testing showed an increase in the level of formation of foreign language professional competence in all types of speech activity (reading, listening, writing, grammar, speaking), in particular, an improvement in the accuracy of task performance and the ability to use professional vocabulary in the context of professional activity.

The results of the questionnaire and pedagogical observation showed an increase in the level of learning motivation, interest in the discipline, student activity during classes and readiness for independent work. An increase in awareness of assessment criteria was recorded, as well as a positive attitude towards self-assessment and mutual assessment as tools for tracking one's own progress.

Analysis of data from the Moodle learning management system showed an increase in the frequency of use of the educational environment, an increase in the level of task performance, improved success rates and more systematic participation of cadets in the educational process. This indicates an increase in the regularity of educational activities and the stability of the implementation of educational tasks.

It has been established that the integration of digital technologies, formative assessment, as well as self-assessment and peer assessment tools contributes to improving the quality of the educational process, developing cadets' assessment competence and increasing their learning motivation. The use of digital benchmarking tools ensures greater objectivity, transparency and systematic assessment, and also creates conditions for constant monitoring of educational achievements and correction of the educational process.

Prospects for further research lie in expanding the sample of participants, using experimental designs with control groups, as well as studying the possibilities of integrating artificial intelligence tools and adaptive learning systems into the assessment process. Special attention needs to be paid to the development of tools aimed at further developing the assessment competence of education seekers in the context of digitalisation.

CONFLICT OF INTEREST

The author declares that there are no conflicts of interest regarding the publication of this paper.

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ARTIFICIAL INTELLIGENCE STATEMENT

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THE EDUCATIONAL POTENTIAL OF EMOTIONAL INTELLIGENCE IN SHAPING A CULTURE OF INCLUSIVE INTERACTION AMONG STUDENT YOUTH

ПЕДАГОГІЧНИЙ ПОТЕНЦІАЛ ЕМОЦІЙНОГО ІНТЕЛЕКТУ У ФОРМУВАННІ КУЛЬТУРИ ІНКЛЮЗИВНОЇ ВЗАЄМОДІЇ СТУДЕНТСЬКОЇ МОЛОДІ

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ABSTRACT

Purpose. The aim of the article is to investigate the pedagogical potential of emotional intelligence in fostering a culture of inclusive interaction among student youth.

Methodology. A range of scientific methods was employed in the course of the research. In

Мета. Метою статті є дослідження педагогічного потенціалу емоційного інтелекту у формуванні культури інклюзивної взаємодії студентської молоді.

Методологія. У процесі дослідження було використано комплекс наукових методів. Зокрема, метод аналізу та узагальнення

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particular, the method of analysing and synthesising the scientific literature was used to examine contemporary theoretical approaches to the issue of emotional intelligence and its role in interpersonal interaction. The method of comparative analysis enabled the identification of the main scientific approaches to interpreting the concept of 'emotional intelligence' and establishing its significance in shaping a culture of inclusive interaction among students. To identify the pedagogical conditions for the development of emotional intelligence, the method of systematisation and generalisation of psychological and pedagogical research was used, which made it possible to identify the main components of students' emotional competence and determine effective pedagogical methods for its development. The method of pedagogical modelling was also applied, which made it possible to outline the directions for the development of students' emotional intelligence in the educational process, in particular through the use of interactive teaching methods, reflective practices and creating a favourable socio-psychological climate within the student community.

Results: The results of this study suggest that students with more developed components of emotional intelligence (empathy, emotional self-regulation, emotional awareness) demonstrate a higher level of tolerance towards social diversity and a more positive attitude towards an inclusive educational environment. They find it easier to establish interpersonal relationships and show greater readiness to cooperate with and support fellow students who may have different educational needs or individual characteristics. We have developed and proposed the following formats for work: 'Emotional Diary', 'Emotional Mirror', 'Difficult Conversation', 'University without Barriers', 'Week of Empathy'.

Conclusions: Thus, emotional intelligence acts as an important factor in shaping a culture of inclusive interaction among students, as it promotes the development of empathy, tolerance and social responsibility in the process of interpersonal communication. Its pedagogical potential lies in fostering constructive interaction, and preparing students to collaborate with people who have different individual characteristics. The effective creating a culture of inclusive interaction requires a systematic approach, which involves integrating elements of emotional learning into the content of the educational process,

наукової літератури застосовувався для вивчення сучасних теоретичних підходів до проблеми емоційного інтелекту та його ролі у міжособистісній взаємодії. Метод компаративного аналізу дозволив визначити основні наукові підходи до трактування поняття «емоційний інтелект» і встановити його значення у формуванні культури інклюзивної взаємодії студентської молоді. Для визначення педагогічних умов розвитку емоційного інтелекту було використано метод систематизації та узагальнення психолого-педагогічних досліджень, що дало змогу виокремити основні компоненти емоційної компетентності студентів і визначити ефективні педагогічні методи її розвитку. Також застосовано метод педагогічного моделювання, який дозволив окреслити напрями розвитку емоційного інтелекту студентів у навчальному процесі, зокрема через використання інтерактивних методів навчання, рефлексивних практик та створення сприятливого соціально-психологічного клімату у студентському колективі.

Результати. Результати проведеного дослідження дозволяють констатувати: студенти з більш розвиненими компонентами емоційного інтелекту (емпатія, емоційна саморегуляція, емоційна усвідомленість) демонструють вищий рівень толерантності до соціальної різноманітності та більш позитивне ставлення до інклюзивного освітнього середовища. Вони легше встановлюють міжособистісні контакти, проявляють більшу готовність до співпраці та підтримки однокурсників, які можуть мати різні освітні потреби або індивідуальні особливості. Нами розроблено та запропоновано наступні формати роботи: «Емоційний щоденник», «Емоційне дзеркало», «Складна розмова», «Університет без бар'єрів», «Тиждень емпатії».

Висновки. Таким чином, емоційний інтелект виступає важливим чинником формування культури інклюзивної взаємодії студентської молоді, оскільки сприяє розвитку емпатії, толерантності та соціальної відповідальності у процесі міжособистісної комунікації. Його педагогічний потенціал полягає у створенні сприятливого соціально-психологічного клімату в освітньому середовищі, розвитку конструктивної взаємодії та формуванні готовності студентів до співпраці з людьми, які мають різні індивідуальні особливості. Ефективне формування культури інклюзивної взаємодії потребує системного підходу, що передбачає інтеграцію елементів емоційного

using interactive teaching methods, training activities and reflective practices aimed at developing students' emotional competence. Further research could focus on developing pedagogical approaches to fostering emotional intelligence among students within an inclusive educational environment.

Keywords: communication, culture of interaction, emotional intelligence, empathy, inclusion, inclusive educational environment, pedagogical potential, student youth.

навчання у зміст освітнього процесу, використання інтерактивних методів навчання, тренінгових форм роботи та рефлексивних практик, спрямованих на розвиток емоційної компетентності студентів. Подальші дослідження можуть бути спрямовані на розробку педагогічних технологій розвитку емоційного інтелекту студентської молоді в умовах інклюзивного освітнього середовища.

Ключові слова: комунікація, культура взаємодії, емоційний інтелект, емпатія, інклюзія, інклюзивне освітнє середовище, педагогічний потенціал, студентська молодь.

INTRODUCTION

The modern higher education system is characterised by the active implementation of the principles of inclusivity, humanisation and democratisation of the educational process. One of the key tasks of higher education institutions is to create an educational environment that ensures equal opportunities for learning, development and socialisation for all students, regardless of their individual characteristics, health conditions or social status. In this context, the formation of a culture of inclusive interaction among students takes on particular significance.

A culture of inclusive interaction involves the development of tolerance, mutual respect, empathy and a willingness to cooperate with people who have different life experiences, needs and abilities. One of the key factors contributing to the formation of such a culture is the development of an individual's emotional intelligence.

This issue is particularly relevant in the context of the development of inclusive education, as it is students' emotional competence that largely determines the effectiveness of communication, the level of mutual support, and the success of integrating individuals with special educational needs into the academic environment.

In contemporary scientific discourse, the issue of emotional intelligence is viewed as interdisciplinary and one with significant pedagogical potential in the context of higher education. The theoretical foundations of research into emotional intelligence are based on the ability model by Mayer, Caruso, and Salovey (2016), in which emotional intelligence is interpreted as a system of cognitive-emotional abilities related to the recognition, understanding and regulation of emotions. This approach has become the methodological basis for most contemporary empirical studies.

A significant number of international publications focus on studying the relationship between emotional intelligence and students' academic performance. In particular, a study by Bilimale et al. (2024) demonstrated a positive correlation between the level of emotional intelligence and students' academic achievement, which is explained by better self-regulation and stress resilience. Similar results were obtained by Saleem, Ullah, and Zafar (2024), who emphasise the role of emotional intelligence as a factor in enhancing academic performance through the development of motivation and interpersonal skills.

The study by Caballero-García and Ruiz (2025) emphasises the relationship between emotional intelligence and students' subjective well-being, which directly influences the quality of their social interactions. The authors argue that a high level of

emotional intelligence contributes to the formation of a positive socio-psychological climate, which is essential for an inclusive educational environment. Similarly, Halimi et al. (2021) establish that emotional intelligence acts as a predictor of both academic success and social adaptation among students in higher education institutions.

A separate area of research is represented by studies dedicated to the development of emotional competence in education. Celume and Zenasni (2024) emphasise the importance of integrating emotional learning into the pedagogical process as a prerequisite for the development of creativity, empathy and social interaction. In this context, emotional intelligence is viewed not merely as an individual characteristic, but as a resource for formation an inclusive culture.

Of particular relevance to the topic of inclusion are the studies by Grynova and Hubar (2025), in which empathy and tolerance are identified as key determinants of the culture of interaction within the context of inclusive education. The authors stress the need to implement innovative pedagogical practices aimed at developing the emotional sensitivity of future professionals.

Ukrainian researchers expand on these points, highlighting the role of emotional intelligence as a soft skill (Ryshchak et al., 2023; Bilotserkovets et al., 2024), a factor in psychological resilience (Tsiupenko, 2024) and stress management (Usyk, 2024). Studies also highlight the importance of an inclusive culture as a key component of the modern educational environment (Hubar et al., 2024).

Thus, an analysis of previous publications shows that an empirical approach to studying emotional intelligence as a factor in students' academic success and psychological well-being dominates in researchers' studies. At the same time, the issue of its pedagogical potential in shaping a culture of inclusive interaction has not been sufficiently explored, which highlights the relevance of further scientific research in this area.

METHODOLOGY

The methodological framework of this work is based on the principles of a systematic approach, the humanisation of the educational process, person-centred learning and inclusivity. The use of a systematic approach made it possible to view emotional intelligence as a complex, integrative construct comprising the cognitive, emotional and social components of personality. The person-centred approach allowed us to focus on the individual characteristics of students' development, their emotional needs and opportunities for self-realisation within the educational environment.

A range of methods was employed in the course of the research. In particular, the method of analysing and synthesising the scientific literature was used to examine contemporary theoretical approaches to the issue of emotional intelligence and its role in interpersonal interaction. We also employed the method of comparative analysis, which enabled us to identify the main scientific approaches to interpreting the concept of 'emotional intelligence' and to determine its significance in shaping a culture of inclusive interaction among students.

To identify the pedagogical conditions for the development of emotional intelligence, we applied the method of systematising and summarising the results of psychological and pedagogical research. This enabled us to identify the main components of students' emotional competence, as well as to determine effective pedagogical methods and technologies aimed at its development.

In addition, the study employed a pedagogical modelling method, which made it possible to identify potential directions for developing students' emotional intelligence during the learning process. Based on this method, pedagogical conditions for the formation of a culture of inclusive interaction were outlined, involving the use of interactive teaching methods, the development of reflective practices, and the creation of a supportive socio-psychological climate within the student community.

RESULTS

Emotional intelligence is a complex psychological construct that combines cognitive, emotional and social components of the personality. Its foundation lies in an individual's ability to be aware of their own emotions and those of others, interpret them appropriately and regulate them effectively.

The structure of emotional intelligence typically includes several key components:

- emotional awareness – the ability to recognise one's own emotional states;
- emotional self-regulation – the ability to control and manage one's own emotions;
- empathy – the ability to understand the emotions and experiences of others;
- social skills – the ability to interact effectively with others (Caballero-García & Ruiz, 2025; Lutsa, 2023).

It is these components that play a key role in shaping interpersonal relationships within the student community and contribute to the development of a culture of inclusive interaction.

Inclusive education is based on the principles of equality, accessibility and respect for diversity. It involves creating conditions for the education of all students, regardless of their individual characteristics (Tsiupenko, 2024).

In this context, a culture of inclusive interaction takes on particular significance. It entails:

- a tolerant attitude towards diversity;
- a willingness to cooperate and support one another;
- respect for the dignity of every individual;
- openness to intercultural and social interaction (Mayer et al., 2016; Usyk, 2024).

The formation of such a culture is impossible without the development of students' emotional competence, as it is emotional intelligence that provides the capacity for empathy, understanding and support of others.

It is important to note that higher education institutions possess significant pedagogical potential for developing the emotional intelligence of students, as it is within the academic environment that the personal, social and communicative competencies of future professionals are intensively shaped (Fedorchenko et al., 2024). The educational process in higher education involves not only the transfer of professional knowledge and skills, but also the development of the ability for effective interpersonal interaction, emotional self-regulation, empathy and social responsibility (Celume & Zenasni, 2024). It is for this reason that the development of students' emotional intelligence should be regarded as one of the key areas of contemporary pedagogical practice.

The educational potential for developing emotional intelligence can be realised through the use of a variety of pedagogical approaches, interactive teaching methods and

specially organized educational practices. One important area is the integration of elements of emotional learning into the content of educational programmes. This involves incorporating into the learning process activities that promote awareness of one's own emotions, the development of empathy, the formation of constructive communication skills, and the ability to resolve interpersonal conflicts.

Among the effective means of developing emotional intelligence, we propose conducting special training sessions on the development of emotional competence. During such sessions, students learn to recognise their own emotional states, analyse their causes, and analyse their impact on behaviour. For example, as part of the training, it is advisable to conduct the 'Emotional Diary' exercise, in which students are asked to record their own emotions, the situations that triggered them, and their responses to them over a specific period. The results are then discussed in a group, which promotes reflection and a better understanding of emotional reactions, both their own and those of others. Another example is the 'Emotional Mirror' exercise, during which one student describes a specific life situation that evoked strong emotions, whilst the other participants attempt to identify the narrator's emotional state and suggest ways to offer support. Such exercises help foster empathy and develop emotional perception skills.

Interactive sessions aimed at developing communication skills are also an important tool for fostering emotional intelligence. For example, the teaching process may incorporate group work methods, during which students undertake joint tasks, discuss different perspectives and seek optimal solutions to problematic situations. Such activities contribute to the development of active listening skills, a tolerant attitude towards others' opinions, and the ability to constructively argue one's own position (Bilimale et al., 2024). In particular, organising thematic discussions on issues of inclusive interaction is an effective approach. For example, students may be asked to discuss a situation where a student with special educational needs joins a study group. During the discussion, participants analyse potential difficulties in interaction, identify ways to provide support, and develop skills in empathetic behaviour.

Role-playing and the modelling of social situations offer significant potential for the development of emotional intelligence. In such exercises, students can take on the roles of various participants in communicative interaction, which allows them to better understand the feelings and experiences of others. For example, during the role-play 'A Difficult Conversation', one student plays the role of a person experiencing emotional difficulties, whilst another plays the role of the interlocutor who is to provide support. After the role-play, participants analyse their own emotions and behaviour, which helps to develop skills in emotional self-regulation and constructive communication (Grynova & Hubar, 2025).

Project-based activities, which involve students actively collaborating to solve shared challenges, are also an effective means of developing emotional intelligence. Within such projects, students can develop social initiatives aimed at fostering an inclusive environment or promoting a culture of mutual respect within the university community. For example, students can implement the 'University Without Barriers' project, which aims to raise awareness of the needs of people with disabilities and foster a tolerant attitude towards diversity. During the implementation of such a project, students organise information campaigns, hold themed meetings or training sessions, which contributes to the development of social responsibility and emotional sensitivity.

Another example is the 'Week of Empathy' project, within which students organise interactive events aimed at developing empathy and mutual support. Such events may

include themed discussions, creative workshops, screenings and discussions of social films, as well as volunteering initiatives. Participation in such events allows students to better understand the importance of emotional interaction in social life. For example, this event was held on 27 January 2026 at the V.G. Korolenko Poltava National Pedagogical University on the initiative of the authors of this article (Figure 1).

Figure 1

Organisation of the 'Empathy Week' event



It is also important to emphasise that the teacher plays a special role in the development of students' emotional intelligence, acting not only as a source of academic knowledge but also as an organiser of interpersonal interaction and a facilitator of group processes. The teacher can create conditions for open dialogue, encourage reflection and foster an atmosphere of trust within the learning group (Vrochynska et al., 2023; Khattak et al., 2025). For example, during lessons, the teacher may use the 'reflective circle' method, where at the end of the session students share their own impressions, emotions and thoughts regarding the learning process. This practice promotes the development of emotional openness and the formation of self-reflection skills.

The development of students' emotional intelligence is a key factor in shaping a culture of inclusive interaction, as it directly influences the quality of interpersonal relationships within the student community. In particular, a high level of emotional intelligence helps to increase empathy and mutual understanding, enabling students to gain a deeper awareness of others' emotional states, respond appropriately to them, and build partnerships based on respect and support (Halimi et al., 2021). This, in turn, fosters a tolerant attitude towards people with special educational needs, acceptance of individual differences, and a readiness for constructive interaction in a diverse environment.

Another important outcome of developing emotional intelligence is a reduction in conflict within the student community, as the skills of emotional self-regulation and understanding others' emotions help to prevent and effectively resolve interpersonal

conflicts. At the same time, skills in constructive communication develop, manifesting in the ability to engage in dialogue, articulate one's own position with reasoned arguments, listen to the other person, and achieve mutual understanding.

Students with a high level of emotional intelligence are characterised by greater openness to interaction, the ability to empathise, and a willingness to support others, which creates favourable conditions for the formation of a positive socio-psychological climate within the academic community. Furthermore, the development of emotional intelligence contributes to the formation of social responsibility and civic awareness among students, as it encourages them to adhere to ethical standards, respect the rights of others and actively participate in building an inclusive educational environment (Saleem et al., 2024; Lourenço et al., 2025).

It is important to note that shaping a culture of inclusive interaction within the student community requires a systematic, targeted approach involving the implementation of a range of interrelated educational measures. One of the key areas is the introduction of psychological and pedagogical training sessions focused on developing empathy, emotional self-regulation and the ability to understand others' emotions (Tobias et al., 2025). Such training sessions create a safe space for practising emotional interaction skills, foster a tolerant attitude towards diversity and enhance students' emotional sensitivity.

Interactive teaching methods play an important role, in particular discussions, role-plays, case studies and group projects, which ensure students' active participation in the learning process and encourage them to collaborate. Through such activities, students develop skills in constructive communication, the ability to work in a team, to consider different points of view and to reach joint decisions, which are essential for effective inclusive interaction (Hontarenko & Kovalenko, 2024; Alenezi, 2024).

Equally significant are socio-psychological projects aimed at supporting an inclusive educational environment. Student participation in such initiatives helps to raise awareness of the social significance of inclusion, foster civic engagement and cultivate a responsible attitude towards others. Practical experience of interacting with different social groups enables students to better understand the needs of others and overcome stereotypes (Kolbina et al., 2025).

Volunteering is also an effective means of fostering a culture of inclusive interaction, as it provides direct experience of helping and supporting people with different individual characteristics. Such activities promote the development of social responsibility, altruism and a willingness to cooperate, whilst also instilling enduring humanistic values.

Reflective practices, which involve students becoming aware of their own emotions, experiences and attitudes towards others, hold a special place. The use of reflection journals, group discussions and self-analysis of interaction experiences helps deepen self-awareness, the develop the ability for self-regulation and foster critical reflection on one's own behaviour (Hubar et al., 2024; Ryshchak et al., 2023).

The comprehensive application of these approaches contributes to the formation of values of mutual respect, support and cooperation among students, which form the basis of a culture of inclusive interaction and are an important prerequisite for creating a humanistic educational environment.

An important aspect of the study is the identification of criteria for assessing the development of a culture of inclusive interaction among students. It is advisable to identify both quantitative and qualitative indicators focused on the process of interpersonal

interaction. In particular, the criteria may include: the level of empathetic response in communication, the ability to resolve conflicts constructively, the frequency of mutual assistance and support within the student community, the level of tolerance towards diversity, as well as active participation in joint projects and interactive forms of work.

Additionally, it is advisable to use student self-assessment and pedagogical observation, which allows for tracking changes in behaviour and communication strategies. The proposed system of criteria enables a comprehensive assessment of the effectiveness of implementing emotional intelligence development programmes in the educational environment.

The results of this study suggest that students with more developed components of emotional intelligence (empathy, emotional self-regulation, emotional awareness) demonstrate a higher level of tolerance towards social diversity and a more positive attitude towards an inclusive educational environment. They find it easier to establish interpersonal relationships and show greater readiness to cooperate with and support fellow students who may have different educational needs or individual characteristics.

We have developed and proposed the following formats for work: ('Emotional Diary', 'Emotional Mirror', 'Difficult Conversation', 'University without Barriers', 'Week of Empathy'). Further research could focus on developing pedagogical approaches to fostering emotional intelligence among students within an inclusive educational environment.

DISCUSSION

The obtained research results are consistent with current scientific approaches to understanding emotional intelligence as a key factor in effective educational interaction. In particular, the link established in the study between the development of emotional intelligence and the formation of a culture of inclusive interaction correlates with the conclusions of Bilimale, Hegde, Pragadesh, Rakesh, Anil, and Gopi (2024) and Saleem, Ullah, and Zafar (2024), who demonstrate the influence of emotional competencies on academic performance and students' social adaptation. This confirms that emotional intelligence functions not only as an individual characteristic but also a socially significant resource.

At the same time, the study's findings expand upon the approaches presented in the works of Caballero-García and Ruiz (2025), where emotional intelligence is considered in the context of subjective well-being. In our study, the focus is shifted to the pedagogical aspect – specifically, to the possibilities of purposefully developing emotional competencies as the foundation of an inclusive culture of interaction.

It is also important to align the obtained results with the views of Celume and Zenasni (2024), who emphasise the need to integrate emotional learning into the educational process. This study demonstrates that the use of interactive teaching methods (workshops, case studies, reflective practices) promotes the development of empathy, tolerance and constructive communication skills, which are key components of inclusive interaction.

At the same time, the results partially substantiate the conclusions of Grynova and Hubar (2025) regarding the role of empathy and tolerance as determinants of an inclusive culture. Unlike previous studies, this work considers these qualities as ones that can be purposefully developed through pedagogical technologies for the development of emotional intelligence.

At the same time, certain limitations should be noted. Most studies are quantitative in nature and focus on measuring the level of emotional intelligence, whilst the

pedagogical mechanisms for its development remain insufficiently explored. In this context, the results of our study have theoretical and practical significance, as they specify the forms and methods of work aimed at fostering inclusive interaction.

At the same time, the implementation of emotional intelligence development programmes in higher education is accompanied by a number of practical difficulties. One of the key obstacles may be resistance from lecturers, who are primarily focused on traditional cognitive learning outcomes and are not always prepared to integrate emotionally oriented approaches into their teaching practice. Furthermore, the limited teaching time within the constraints of rigidly structured educational programmes complicates the systematic implementation of training sessions, reflective practices and interactive forms of work.

An equally important challenge is the difficulty of objectively assessing the level of emotional intelligence and related 'soft skills', as these are difficult to measure using standardised methods and often require the use of complex qualitative and quantitative techniques. Taking these challenges into account is a prerequisite for developing realistic and effective pedagogical strategies for integrating emotional learning into the higher education system.

Thus, the question of the optimal pedagogical conditions for integrating emotional intelligence into the educational process, as well as the need to develop systematic programmes for emotional education in higher education institutions, remains a matter of debate. This opens up prospects for further research aimed at empirically testing the effectiveness of the proposed pedagogical approaches.

CONCLUSIONS

Emotional intelligence is therefore a key factor in fostering a culture of inclusive interaction among students. Its development helps to enhance students' empathy, tolerance and social responsibility.

The pedagogical potential of emotional intelligence lies in its ability to create a favourable socio-psychological climate within the educational environment, foster constructive communication, and prepare students to interact with people who possess diverse individual characteristics.

The effective formation of a culture of inclusive interaction requires a systematic approach, involving the integration of elements of emotional learning into the content of the educational process, the use of interactive teaching methods, and the creation of conditions for the development of students' emotional competence. Further research could focus on the development of pedagogical technologies for fostering emotional intelligence among students within an inclusive educational environment.

CONFLICT OF INTEREST

The authors declare that there are no conflicts of interest regarding the publication of this paper.

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No artificial intelligence tools were used in the preparation of this manuscript.

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PSYCHOLOGICAL BOUNDARIES AND SPACE SOVEREIGNTY IN THE DIGITAL AGE: INTERGENERATIONAL DIFFERENCES AMONG GENERATIONS X, Y, AND Z

ПСИХОЛОГІЧНІ МЕЖІ ТА ПРОСТОРОВИЙ СУВЕРЕНІТЕТ У ЦИФРОВУ ЕПОХУ: МІЖПОКОЛІННЄВІ ВІДМІННОСТІ МІЖ ПОКОЛІННЯМИ X, Y ТА Z

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ABSTRACT

Purpose. This article presents a theoretical and empirical analysis of personal psychological boundaries among representatives of Generations X, Y, and Z in the context of accelerating digital transformation. Drawing on frameworks from boundary psychology and generational theory, the study aimed to

Мета. У статті представлено теоретичний та емпіричний аналіз особистісних психологічних меж серед представників поколінь X, Y та Z в контексті цифрової трансформації. Спираючись на теорії психології меж і концепцію поколінь, дослідження мало на меті виявити

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identify intergenerational differences in the characteristics of psychological boundaries, sovereignty of psychological space, and intolerance of uncertainty, as well as to examine the relationships among these constructs within each generational cohort.

Methodology. The study involved 128 adult respondents from Ukraine, divided into three age groups in accordance with the generational approach: Generation X ($n = 34$; aged 40-60), Generation Y ($n = 50$; aged 25-39), and Generation Z ($n = 44$; aged 18-24). Data were collected online using E. Hartmann's Boundary Questionnaire, Psychological Space Sovereignty Measure, and the IUS-12 Intolerance of Uncertainty Scale. Statistical analyses included the Kruskal-Wallis test, Mann-Whitney U post hoc comparisons, and Spearman correlation coefficients.

Results. The findings indicate that Generation X representatives exhibit higher psychological space sovereignty and "thicker" personal boundaries, whereas Generation Z demonstrates more permeable, flexible, and less integrated boundaries. Generation Y occupies an intermediate position. Statistically significant between-group differences were found for sovereignty of territory, sovereignty of personal possessions, and overall boundary thickness. Correlation analysis revealed distinct patterns of association between boundary characteristics and intolerance of uncertainty across generations: no significant correlation in Generation X, a negative association between uncertainty intolerance and habit sovereignty in Generation Y, and a positive correlation between thin boundaries and uncertainty intolerance in Generation Z. Overall intergenerational differences in uncertainty intolerance were less pronounced.

Conclusions. The most marked intergenerational differences concern the sovereignty of psychological space and the overall thickness of personal boundaries, whereas differences in intolerance of uncertainty are comparatively weaker. The findings carry practical implications for the design of intergenerational interaction and support programs, particularly within digital environments.

Keywords: Generation X, Generation Y, Generation Z, generational theory, intolerance of uncertainty, personal boundaries, psychological space sovereignty.

міжпоколіннєві відмінності в характеристиках психологічних меж, суверенітеті психологічного простору та нетерпимості до невизначеності, а також проаналізувати зв'язки між цими конструктами в кожній поколіннєвій групі.

Методологія. У дослідженні взяли участь 128 дорослих респондентів з України, розподілених на три вікові групи відповідно до поколіннєвого підходу: покоління X ($n = 34$; вік 40-60 років), покоління Y ($n = 50$; вік 25-39 років) і покоління Z ($n = 44$; вік 18-24 роки). Дані збиралися онлайн за допомогою Опитувальника меж Е. Гартманн, Шкали суверенітету психологічного простору та Шкали нетерпимості до невизначеності IUS-12. Статистичний аналіз включав критерій Краскела-Воллеса, апостеріорні порівняння за критерієм Манна-Уїтні та коефіцієнти рангової кореляції Спірмена.

Результати. Дані свідчать про те, що представники покоління X демонструють вищий суверенітет психологічного простору та «товстіші» особистісні межі, тоді як покоління Z характеризується більш проникними, гнучкими та менш інтегрованими межами. Покоління Y займає проміжне положення. Статистично значущі відмінності виявлені щодо суверенітету території, суверенітету особистого майна та загального показника товщини меж. Кореляційний аналіз показав різні конфігурації зв'язків між межами та нетерпимістю до невизначеності по поколіннях: відсутність значущих кореляцій у поколінні X, негативний зв'язок між нетерпимістю до невизначеності та суверенітетом звичок у поколінні Y, а також позитивна кореляція між «тонкими» межами та нетерпимістю до невизначеності у поколінні Z. Міжпоколіннєві відмінності за показниками нетерпимості до невизначеності загалом виявилися менш вираженими.

Висновки. Найвиразніші міжпоколіннєві відмінності стосуються суверенітету психологічного простору та загальної товщини особистісних меж, тоді як відмінності в нетерпимості до невизначеності є порівняно слабшими. Результати мають практичне значення для розроблення програм міжпоколіннєвої взаємодії та підтримки, зокрема в цифровому середовищі.

Ключові слова: покоління X, покоління Y, покоління Z, поколіннєва теорія, нетерпимість до невизначеності, особистісні кордони, суверенітет психологічного простору.

INTRODUCTION

In contemporary sociocultural conditions, the issue of personal boundaries and the sovereignty of psychological space has gained particular significance owing to the digitalization of everyday life, the transformation of communicative practices, and the increasing intensity of interactions between representatives of different generations. These changes in the social environment influence the way psychological space is experienced, the regulation of interpersonal distance, and conceptions of privacy, autonomy, and acceptable limits of intrusion. In this context, studying personal boundaries across different age cohorts enables a deeper understanding of the psychological mechanisms underlying intergenerational interactions, the sources of communicative difficulties, and the conditions that facilitate constructive interaction in family, educational, and professional settings.

The issue of personal boundaries in intergenerational interactions occupies a central place in contemporary personality and social psychology (Altman, 1975; Westin, 1967; Margulis, 2003; Hartmann, 1991; Mannheim, 1952). Since the configuration of the “Self-Other” boundary shapes trajectories of social perception, trust, empathy, and cooperation between age cohorts in the context of the rapid digital transformation of society (Tajfel & Turner, 1979; Pettigrew & Tropp, 2006; Putnam, 2000; van Deursen & Van Dijk, 2014; Van Dijk, 2017), research on personal boundaries has become particularly relevant.

Within phenomenological and differential psychology, boundaries are understood as a multidimensional regulatory system that filters, selects, and modulates stimuli, ensuring the integrity of the subject while preserving openness to social exchanges (Altman, 1975; Westin, 1967). In classical approaches, privacy is conceptualized as selective control over access to the self, balancing openness and closedness, and is realized through behavioral and cognitive mechanisms of interactional self-regulation (Margulis, 2003; Hartmann, 1991). In this context, the sovereignty of psychological space may be understood as the degree to which an individual maintains control over their own boundaries, habits, values, possessions, body, and social contacts.

According to E. Hartmann's continuum of “thin thick boundaries,” individuals with thin boundaries are characterized by increased permeability between internal and external experience, including creativity, associativity, and a greater ease in blending the imagined and the real, whereas thick boundaries are associated with clearer stratification, stability, and a stronger need for structure in interactions (Hartmann, 1991). Some studies point to a tendency for personal boundaries to “thicken” with age across ontogenesis, a pattern associated with accumulated life experience and the formation of stable, self-protective scripts. This provides grounds for considering age and generational affiliation as factors related not only to boundary permeability but also to psychological sovereignty.

Closely related to boundaries is the construct of tolerance/intolerance of uncertainty (IU, Carleton et al., 2007), which reflects a stable cognitive-affective tendency to perceive ambiguous situations as threatening, thereby increasing anxiety, caution, and risk avoidance (Buhr & Dugas, 2002; Dugas et al., 2001). Empirical evidence demonstrates associations between IU and boundary regulation strategies, including a preference for more structured modes of interaction and lower readiness for cross-group contact under conditions of informational uncertainty (Carleton et al., 2012). Conversely, greater tolerance of uncertainty promotes interpersonal flexibility and acceptance of “otherness,” which, in an intergenerational context, may manifest as a

greater willingness to negotiate boundaries, experiment with new communication channels, and resolve conflicts constructively (Bomyea et al., 2015).

The absence of statistically significant intergenerational differences in intolerance of uncertainty requires additional contextualization. Data were collected in Ukraine in November 2024, that is, under conditions of prolonged martial law, continuing security threats, forced educational adaptation, and accumulated experience of distance or blended learning.

In such circumstances, intolerance of uncertainty may be shaped less by generational affiliation and more by a shared macro-social context. War-related uncertainty affects all age cohorts simultaneously: students, teachers, parents, and working adults are all exposed to disrupted routines, safety risks, unpredictable schedules, displacement, and emotionally loaded information flows.

This may explain why intolerance of uncertainty was relatively high and weakly differentiated across the three generations in the present sample. In other words, the wartime context could have levelled or attenuated generational differences by creating a common background of chronic unpredictability. Recent Ukrainian studies support this interpretation. Research on Ukrainian university students during the war demonstrates a high prevalence of depression, anxiety, sleep problems, and post-traumatic stress symptoms, as well as a negative association between these mental health problems and academic performance (Pinchuk et al., 2025).

Similarly, Korda et al. (2025) emphasize that war-related stressors affect both psychological well-being and academic functioning among Ukrainian students. Therefore, in the present study, the lack of pronounced intergenerational differences in intolerance of uncertainty should not be interpreted as evidence that uncertainty is irrelevant to generational boundary formation. Rather, it may indicate that wartime conditions operate as a powerful contextual moderator, raising the general level of uncertainty-related tension across all groups.

The theoretical background of the present study is informed by generational theory and Mannheim's classical conception of generations as "historically situated" cohorts (Mannheim, 1952). Against this backdrop, Generations X, Y, and Z demonstrate distinct communicative repertoires and technological profiles: from the relatively "analog" environment of Generation X (Gen X), through the digitally enriched environment of Generation Y (Gen Y), to the fully mediatized everyday life of Generation Z (Gen Z), often described through the concept of digital natives (Prensky 2001; van Deursen & van Dijk 2014). Importantly, these structural differences in the trajectories of "socialization with technology" may mediate the configuration of boundaries, including their degree of permeability, access regimes, and "protocols" of interaction, as well as the level of psychological space sovereignty and threshold levels of acceptable uncertainty in intergenerational contact (van Deursen & van Dijk, 2014; Venkatesh et al., 2003).

From a social-psychological perspective, intergenerational relationships are shaped by the dynamics of intergroup interactions. Social identity theory explains the tendency toward in-group favoritism and heightened sensitivity to out-group differences (Tajfel & Turner, 1979), thereby activating defensive scripts in "older-younger" interactions. The contact hypothesis suggests that systematic positive contact under conditions of reduced status imbalance and shared goals decreases prejudice (Pettigrew & Tropp, 2006).

However, in contemporary urbanized contexts, opportunities for regular intergenerational interactions are narrowing (Putnam, 2000). Consequently, without purposeful interventions, privacy-related barriers, whether linguistic, symbolic, or instrumental, may become entrenched and reproduce a cycle of distrust.

The technological environment acts as a key moderator of this dynamic. Research on intergenerational ICT programs shows that technology-mediated interaction reduces instrumental barriers (e.g., lack of skills, fear of errors), expands communication through visual, multimodal, and asynchronous formats, and creates emotionally safe contexts in which personal boundaries can be negotiated without threatening integrity (Döring et al., 2019; Phang et al., 2023, 2022; Döring et al., 2022).

In digital skills training projects, older participants report increased self-efficacy, reduced social isolation, and greater readiness for sustained online contact, while younger participants gain mentoring and caregiving experience, fostering intersubjective recognition of the other generation (López Seguí et al., 2019; Phang et al., 2023). Evidence from the use of communication platforms (e.g., video calls, messaging, shared media) further indicates that digital mediation strengthens intergenerational connectedness, while age-adapted design enhances older adults' sense of control over personal boundaries and reduces perceived dependence (Döring et al., 2022; Oliveira et al., 2022).

The relevance of the present study is determined by three factors. First, a demographic shift: the proportion of older adults is increasing, while accelerated digitalization raises the demand for technologies that inclusively connect generations (van Deursen & van Dijk, 2014; Putnam, 2000). Second, psychological and social conditions: the pandemic and wartime crises have heightened background uncertainty, affecting boundary regulation and complicating intergenerational understanding (Carleton et al., 2012).

At the same time, digital platforms function as a core infrastructure of social interaction, enabling the construction of contexts for negotiating personal boundaries (Döring et al., 2022; Oliveira et al., 2022). Third, a methodological gap: there is a lack of integrated models that jointly consider personal boundaries, intolerance of uncertainty, and technological mediation as interrelated mechanisms of intergenerational relations (Hartmann, 1991; Venkatesh et al., 2003).

In addition, empirical studies comparing Generations X, Y, and Z rarely examine, within a single design, the sovereignty of psychological space, boundary thickness/permeability, and intolerance of uncertainty, as well as the relationships among these variables within each cohort. This gap defines the rationale for the present study.

This study aimed to identify intergenerational differences in indicators of psychological space sovereignty, thickness/permeability of personal boundaries, and intolerance of uncertainty among representatives of Generations X, Y, and Z, and to analyze the relationships among these variables within each group.

Accordingly, the following hypotheses were formulated:

1. Representatives of Gen X would demonstrate higher levels of psychological space sovereignty than representatives of Generations Y and Z.
2. Representatives of Gen Z are characterized by thinner and more permeable personal boundaries than those of Generations X and Y;

3. The relationships among personal boundary characteristics, psychological space sovereignty, and intolerance of uncertainty would differ across Generations X, Y, and Z.

METHODOLOGY

Participants

The study involved 128 adult respondents from Ukraine who were recruited on a voluntary basis. Participants were recruited through the online dissemination of a Google Forms questionnaire in November 2024. The inclusion criteria were legal adulthood, residence in Ukraine, provision of informed voluntary consent, and completion of the questionnaire.

Participants were assigned to three groups according to the age criteria of generational theory: Gen X (n = 34; 40-60 years), Gen Y (n = 50; 25-39 years), and Gen Z (n = 44; 18-24 years). Women comprised 64% of the sample. The study was conducted in accordance with the generally accepted ethical principles for research involving human participants as set forth in the Declaration of Helsinki. No group or individual manipulations were employed, and data confidentiality was ensured.

Measures

Three standardized instruments were used to assess personal boundaries.

1. Hartmann's Boundary Questionnaire is a psychometric instrument (Hartmann, 1991) designed to assess the "thickness" or "thinness" of psychological boundaries.
2. Psychological Space Sovereignty measure consists of six scales, each assessing the respondent's tendency to protect a specific domain of personal space: the physical body, private territory, personal possessions, habits, social ties, and values (Volynchuk, 2022).
3. The Intolerance of Uncertainty Scale, short form (IUS-12) is a brief version of the original instrument (Carleton et al., 2007), adapted into Ukrainian (Hromova, 2021). It comprises two subscales, prospective anxiety and inhibitory anxiety, and reflects a negative response of uncertainty and ambiguity.

All instruments have previously demonstrated reliability and validity in populations comparable to the present sample, including samples of Ukrainian adolescents and adults.

Procedure

Data were collected online using Google Forms in November 2024. Participants were informed of the study's general topic without disclosing the specific hypotheses to reduce expectancy effects.

The data were analyzed using quantitative statistical methods in the SPSS software. The Kolmogorov-Smirnov test was used to assess the distribution of variables. In light of the distributional results, the nonparametric Kruskal-Wallis test (H) was used to examine between-group differences, the Mann-Whitney U test was applied for pairwise comparisons, and Spearman's rank-order correlation coefficient was used to assess the associations among the variables.

The level of statistical significance was set at $p < .05$. Results with p -values greater than .05 were not interpreted as statistically significant. Values close to the conventional threshold were treated only as descriptive findings and interpreted with caution.

Effect sizes were additionally calculated to assess the practical significance of the observed differences. For the Kruskal-Wallis test, eta-squared based on the H statistic (η^2H) was used. For pairwise Mann-Whitney U comparisons, rank-biserial correlation (r) was calculated as an effect size. Effect sizes were interpreted as small, moderate, or large according to conventional benchmarks.

RESULTS

Descriptive Statistics

In the first stage of the analysis, the mean scores on all scales of personal boundaries and intolerance of uncertainty were compared across the three groups (X, Y, and Z).

The overall results are presented in Table 1 and Figure 1. The table and figure indicate the direction of the between-group differences: Gen X obtained the highest scores on the psychological space sovereignty scales. In contrast, Gen Z demonstrated the lowest mean scores on these scales, indicating that their boundaries were, on average, the most open and flexible. Gen Y occupied an intermediate position, although on some scales, it was closer to Gen X and on others to Gen Z.

Table 1

Mean values of personal boundary indicators and tolerance of uncertainty across Generations X, Y, and Z

Scale / Indicator	Gen X	Gen Y	Gen Z
SPB	8,50	8,29	7,86
ST	9,56	9,08	7,68
SP	11,32	9,47	9,64
SH	9,41	8,65	7,95
SST	4,79	4,47	4,25
SV	10,00	8,84	8,80
Boundaries	48,38	50,69	53,91
Anxiety	38,00	38,71	39,75
PA	24,32	24,29	24,27
IA	13,68	14,41	15,48

Note. SPB – sovereignty of the physical body, ST – sovereignty of territory, SP – sovereignty of possessions, SH – sovereignty of habits, SST – sovereignty of social ties, SV – sovereignty of values; PA – prospective anxiety; IA – inhibitory anxiety.

As shown in Table 1, the integral boundaries score on Hartmann's questionnaire increases from Gen X to Gen Z: it is lowest in Gen X (48.4 points), corresponding to "thicker" boundaries, and highest in Gen Z (53.9 points), indicating a tendency toward "thinner" boundaries. Gen Y showed an intermediate value (50.7). Thus, at the descriptive level, the data reveal a trend consistent with the hypothesis of generational change in the personal boundaries.

Figure 1

Mean subscale scores for psychological space sovereignty across Generations X, Y, and Z.

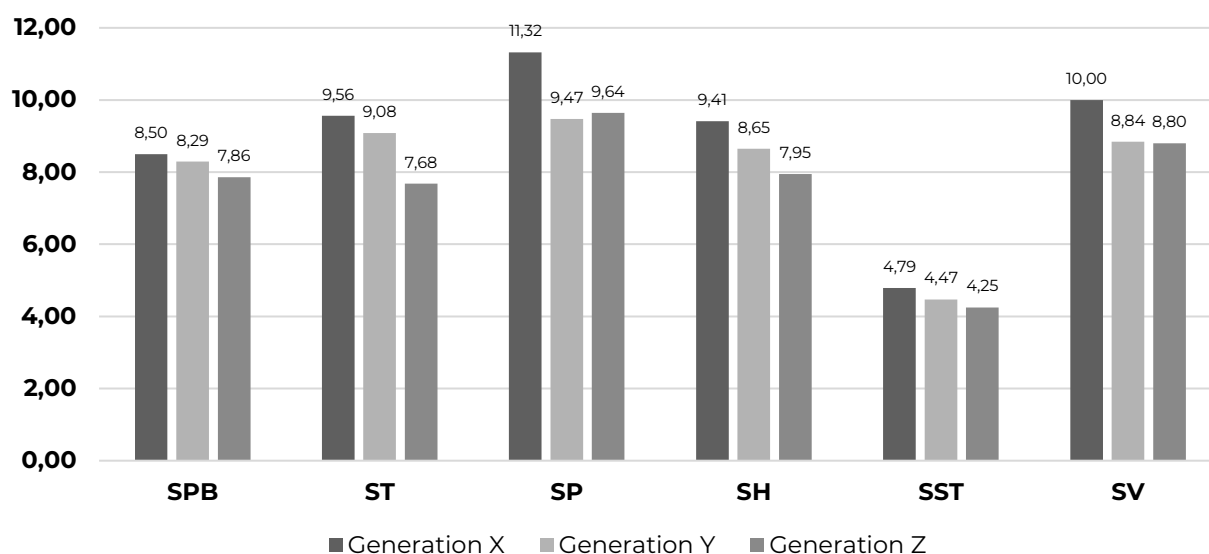


Figure 1 reflects the same pattern of differences: Gen X (yellow bars) shows higher mean scores on all reported scales than younger generations, indicating a tendency toward more rigid personal boundaries. Gen Z (pink bars) had the lowest scores, indicating the most flexible and permeable boundaries. Gen Y (orange bars) occupies an intermediate position in this regard.

To test the statistical significance of the observed between-group differences, the Kruskal–Wallis test (H) was applied to all indicators.

Table 2

Kruskal–Wallis test (H) for each indicator

	SPB	ST	SP	SH	SST	SV	Boundaries	Anxiety	PA	IA
H	1.006	10.091	7.769	5.360	1.432	4.021	11.392	0.936	0.132	4.562
p	.605	.006	.021	.069	.489	.134	.003	.626	.936	.102
η^2H	.000	.065	.046	.027	.000	.016	.075	.000	.000	.020

Note. SPB – sovereignty of the physical body, ST – sovereignty of territory, SP – sovereignty of possessions, SH – sovereignty of habits, SST – sovereignty of social ties, SV – sovereignty of values; PA – prospective anxiety; IA – inhibitory anxiety. η^2H – effect size for the Kruskal–Wallis test.

The Kruskal–Wallis test revealed statistically significant intergenerational differences in the selected variables.

The effect size analysis showed that the strongest effects were observed for the integral boundary score, $\eta^2H = .075$, and sovereignty of territory, $\eta^2H = .065$, both corresponding to a moderate effect. Sovereignty of possessions demonstrated a small-to-moderate effect, $\eta^2H = .046$.

The remaining indicators showed small or negligible effects, which supports the conclusion that the most practically meaningful intergenerational differences concerned territorial sovereignty and the overall thickness of psychological boundaries.

- Specifically, statistically significant results were obtained for the following:

- Sovereignty of territory (ST): $H = 10.09$, $p = .006$, $\eta^2H = .065$. The highest values were observed in Gen X, and the lowest in Gen Z.
- Sovereignty of possessions (SP): $H = 7.769$, $p = .021$, $\eta^2H = .046$. Higher scores were characteristic of Gen X compared with the younger groups.
- Boundaries: $H = 11.392$, $p = .003$, $\eta^2H = .075$. The integral score was highest in Gen Z and lowest in Gen X, corresponding to “thinner” boundaries in the younger group.

For the remaining indicators, the Kruskal–Wallis test did not reveal statistically significant overall between-group differences at $p < .05$.

The overall differences identified by the Kruskal–Wallis test required clarification of which specific groups differed significantly from each other. A post hoc analysis of pairwise comparisons using the non-parametric Mann–Whitney U test provided a more detailed picture. Table 3 includes only those comparisons that remained statistically significant after correction for multiple comparisons.

Table 3

Significant post hoc results based on the Mann–Whitney U test after correction for multiple comparisons

Group	Scale	U	p	r	Direction of difference
X – Y	SP	563.5	.006	.34	X > Y
Y – Z	ST	801.0	.016	.27	Y > Z
	Boundaries	787.5	.012	.28	Z > Y
X – Z	ST	460.5	.004	.38	X > Z
	Boundaries	436.0	.002	.42	Z > X

Note. ST – sovereignty of territory; SP – sovereignty of possessions. *r* – rank-biserial correlation used as an effect size for Mann–Whitney U comparisons.

Pairwise effect sizes showed that the most pronounced practical differences were found between Generations X and Z. The X–Z comparison demonstrated moderate effects for sovereignty of territory ($r = .38$) and the integral boundary score ($r = .42$). The X–Y difference in sovereignty of possessions also showed a moderate effect ($r = .34$), whereas the Y–Z differences in sovereignty of territory and boundary thickness were smaller, approaching a moderate magnitude ($r = .27$ and $r = .28$, respectively).

The largest differences were observed between Generations X and Z. Representatives of Gen X demonstrated significantly higher scores on sovereignty of territory (ST) compared to Gen Z. A statistically significant difference was also found for the integral boundaries indicator: Gen Z exhibited higher scores, indicating “thinner” psychological boundaries, whereas Gen X showed comparatively “thicker” boundaries. No other indicators, including intolerance of uncertainty, differed significantly between these groups after correction for multiple comparisons.

In contrast, Generations X and Y appeared largely similar. A significant difference was identified only for sovereignty of possessions (SP), with higher scores observed in Gen X, suggesting greater protection of personal belongings. No significant differences were found for the remaining sovereignty indicators.

The comparison between Generations Y and Z revealed differences primarily in sovereignty of territory and the integral boundaries indicator. Gen Y scored significantly

higher on ST, while Gen Z again demonstrated higher boundary scores, reflecting greater permeability. Other sovereignty dimensions did not show statistically significant differences.

At the same time, intolerance of uncertainty did not differentiate between Generations Y and Z: no significant differences were found either for the total IUS-12 score or for its subcomponents, indicating comparable levels of anxiety in response to uncertainty across these cohorts.

Correlation Analysis

The next step was to examine how the indicators of personal boundaries and tolerance of uncertainty are related within each generational group. To this end, Spearman correlation coefficients were calculated separately for the main scales in samples X, Y, and Z samples. It was assumed that the pattern of these interrelationships might differ across generations because of differences in life experience and socialization.

In Gen X, the correlation analysis did not reveal statistically significant associations between the integral indicator of personal boundaries and the level of intolerance of uncertainty ($r = -0.10$, $p > .10$). Likewise, none of the psychological space sovereignty subscales demonstrated substantial correlations with the intolerance of uncertainty subscales (all $|r| < .25$, $p > .10$). This may suggest that, for representatives of Gen X, the rigidity or flexibility of personal boundaries is not directly related to the extent to which they fear uncertainty in their lives. In other words, a person from Gen X may have firm boundaries while exhibiting either a high or low level of anxiety in the face of the unknown, and vice versa. It may be assumed that, in this age group, other factors, such as life experience or professional status, exert a stronger influence on tolerance of uncertainty than do the structural characteristics of personality.

In Gen Y, several significant correlations emerged, indicating a relationship between boundaries and uncertainty. In particular, a negative correlation was found between the level of intolerance of uncertainty and the indicator of sovereignty of habits (SH) ($r = -0.34$, $p < .05$). This may suggest that among Millennials, those who tolerate uncertainty less well, that is, those who are more intolerant of it, tend to have more rigid boundaries in the domain of everyday habits and routines and place greater value on stability in their daily schedules and rituals. One possible explanation is that Gen Y members who experience anxiety in response to uncertainty attempt to compensate by imposing order on their lives and constructing clear frameworks and routines to feel safer. This relationship is consistent with the assumption that uncertainty in the external world may prompt individuals to reinforce their personal boundaries to gain more control.

In addition, the correlation between the integral boundaries score and tolerance of uncertainty in Gen Y approached the conventional threshold of statistical significance, but did not formally reach it ($r = -0.27$, $p = .051$). Therefore, this result was not interpreted as statistically significant. At the same time, the direction of the coefficient may be considered descriptively informative, as it is consistent with the broader pattern observed in Gen Y: boundary regulation in this cohort may be connected with attempts to manage uncertainty through greater structure and predictability. However, this observation should be treated as preliminary and requires further verification in larger and more balanced samples.

The most interesting results were obtained for Gen Z. In this group, several significant correlations were identified that differed from the pattern observed in other

generations. First, a positive correlation was found between the integral boundaries indicator (Hartmann) and intolerance of uncertainty ($r = +0.41$, $p < .01$). In other words, in the youngest generation, “thinner” boundaries were associated with higher anxiety in the face of uncertainty during the pandemic. At first glance, this appears unexpected, as one might assume that more open individuals would respond to the unknown more easily. However, our data indicate the opposite: Gen Z representatives with the most permeable boundaries show greater concern about uncertainty. This relationship may suggest that excessively thin boundaries are associated with greater vulnerability: when a young person remains open to external influences, they become more sensitive and more anxious in response to unpredictable events.

Second, Gen Z showed reduced internal coherence across boundary aspects. Correlations among the subscales of psychological space sovereignty were weaker in this group (mean $|r| \sim .20$) than in Gen X (mean $|r| \sim .45$). This may suggest that the structure of personal boundaries in Gen Z is more complex. For example, a young person may have open physical boundaries, experiencing little discomfort from close contact, while maintaining rigid value-related boundaries and not accepting others’ views, or vice versa. In contrast, in the older generation, all aspects of boundaries tend to “move together”: if a person guards their possessions, they are also likely to regulate physical distance, routine, and circle of communication consistently. Such coherence is less characteristic of younger individuals, whose boundaries appear more situational and context-dependent.

DISCUSSION

The present study found that younger generations exhibit less clearly defined and more flexible personal boundaries compared to older generations. The most pronounced contrast was observed between the two extreme groups, Gen X and Gen Z. This provides grounds for interpreting the observed differences as generational specificities in the organization of self-boundaries under conditions of differing socialization experiences. Importantly, the effect size analysis showed that the observed intergenerational differences were not merely statistically significant but also practically meaningful, although their magnitude was generally small to moderate rather than large. This suggests that generational affiliation contributes to differences in psychological space sovereignty and boundary permeability, but it should not be interpreted as the sole or dominant determinant of these characteristics.

In our sample, Gen X representatives demonstrated clear and consistent personal boundaries. They showed higher levels of psychological space sovereignty, more strongly defended the inviolability of personal space, and were more likely to preserve the stability of habits and social surroundings; in other words, their sense of self appeared to be more protected from external influences. This interpretation is consistent with work by Western authors on Gen X, who emphasize its independence and orientation toward autonomy, and who sometimes describe it as a “latchkey generation” that values personal time and space.

Gen Z, by contrast, Gen Z showed the opposite pattern: their personal boundaries were the most permeable and changeable. Our data show reduced sovereignty scores across all domains, from bodily to value-related. In practical terms, this means that a typical young person may be more likely to allow intrusion into personal space, be less reactive to crowding or physical contact, adopt a more flexible attitude toward routines and rules, be more open in the sphere of social ties, and show greater openness in the

value domain by reconsidering or questioning their established beliefs. This configuration of results may be interpreted as reflecting the greater contextuality and plasticity of personal boundaries in the youngest group. This interpretation is consistent with findings suggesting that Gen Z develops in a globalized networked environment in which geographical, informational, and social boundaries are more permeable (Towner et al., 2022).

Recent research on Generation Z in digital learning environments provides an important educational context for interpreting these findings. Although studies directly examining Hartmann's construct of "thin boundaries" in prolonged distance education remain limited, adjacent evidence on digital learning, privacy, self-disclosure, and online interaction is highly relevant. Contemporary higher education research describes Gen Z as an "always-connected" cohort that is highly responsive to multimedia and technology-supported learning environments, but at the same time requires a balance between independent learning and meaningful interpersonal interaction (Rylance-Graham & Ismail, 2026). This is consistent with the present finding that Gen Z demonstrates more permeable and less internally coherent boundaries: such permeability may function as an adaptive resource in flexible, multimodal, and networked learning environments, but it may also increase vulnerability to cognitive and emotional overload.

In this regard, the "thinness" of Gen Z boundaries should not be interpreted only as psychological weakness or immaturity. Rather, it may reflect a mode of adaptation to a learning ecology in which communication, academic tasks, peer interaction, and self-presentation are constantly mediated through digital platforms. Online lectures, learning management systems, chats, video meetings, and social media create a situation in which the boundaries between personal space, educational space, and social space become blurred. Therefore, the lower sovereignty of territory and the higher permeability of personal boundaries observed in Gen Z may be understood as part of a broader transformation of educational subjectivity in the digital age.

At the same time, recent findings on Gen Z's online privacy and self-disclosure suggest that openness in digital environments is ambivalent. Rózsa et al. (2024) showed that Gen Z's willingness to disclose personal information on social media is influenced by interpersonal and reference-group factors, while social isolation and anxiety are also relevant to understanding online self-disclosure. This supports the interpretation of the present results as an "open but vulnerable" configuration: Gen Z students may be more willing to communicate, share, and participate in digital interaction, yet this openness can coexist with heightened sensitivity to uncertainty, external evaluation, and perceived intrusion into personal space.

It is also important to note that Gen Z displayed weaker coherence across different aspects of boundaries. These features may indicate a more differentiated and less-integrated boundary structure. In other words, the personality coherence characteristic of older generations appears to be less pronounced in this group, while boundaries are more strongly influenced by situational and contextual factors. On the one hand, this may provide an adaptive advantage through flexibility, creativity, and the ability to live "in the moment." However, such fluid boundaries may complicate the formation of a stable sense of self and security. This interpretation does not imply that "fragmented identity" was directly measured in the present study; however, it is consistent with descriptions of younger digital cohorts in contemporary literature.

Gen Y demonstrated intermediate characteristics in this regard. On most scales, their scores fell between those of Generations X and Z, suggesting that Millennials have partly inherited a respect for privacy from their parents, as reflected, for example, in their still relatively high valuation of personal possessions and territory, where the differences between Y and Z were statistically significant. Simultaneously, they have acquired characteristics associated with the digital era, including lower sovereignty scores than Gen X, particularly in relation to physical space and social ties. These findings may reflect an intermediate or transitional profile of personal boundaries. Their personal boundaries are generally more flexible than those of the older generation; however, they still retain a certain degree of structure and integration. This balance is evident, among other things, in the fact that Gen Y did not display the same degree of diffusion as Gen Z: the boundary subscales were moderately correlated, suggesting a partially integrated boundary structure. Thus, Millennials appear to demonstrate relatively balanced boundaries: they are no longer as closed as Gen X but not as diffuse as Gen Z. This interpretation is broadly consistent with the view of Gen Y as a cohort that combines elements of both analog and digital social experiences.

Notably, there were no intergenerational differences in the tolerance of uncertainty. Overall, all groups demonstrated low tolerance. This result may be interpreted as indicating relative stability in the intolerance of uncertainty across generations within the present sample. One possible explanation is that, in this case, the generational factor may be outweighed by broader contemporary social conditions: the modern world, characterized by objectively high levels of uncertainty due to pandemics, wars, and economic crises, affects all individuals, regardless of age. For example, the COVID-19 pandemic led to a sharp increase in anxiety across age groups, and war and other major disruptions may bring psychological responses closer (Santabárbara et al., 2021). Thus, our sample, collected in 2024, may reflect a generally elevated background level of intolerance to uncertainty in society. It is also possible that a clearer difference in tolerance of uncertainty would emerge if more widely separated age categories were compared. This warrants further investigation. In particular, it would be of interest to include Baby Boomers (born approximately 1946-1964) and even Generation Alpha (children born after 2010).

Particular attention should be paid to the relationship between personal boundaries and tolerance of uncertainty. In this respect, our results revealed different configurations of associations across the three generations. In Gen X, the absence of any association between boundaries and uncertainty may suggest that their rigid boundaries represent a stable mode of self-regulation not necessarily linked to personal anxiety. They appear to establish boundaries based on values or habits rather than out of fear of the unknown. This explanation is consistent with the obtained result and does not contradict earlier assumptions regarding the relative autonomy of the structural characteristics of personal boundaries.

In Gen Y, a logic of “uncertainty leading to a striving for control” becomes apparent primarily at the level of everyday habits and routines. Millennials who experience greater discomfort with uncertainty may rely more strongly on stable daily patterns, predictable routines, and habitual forms of self-organization. The basis for this interpretation lies in the statistically significant negative association between intolerance of uncertainty and sovereignty of habits. This mechanism is consistent with the concept of intolerance of uncertainty as a driver of a need for certainty: individuals who cannot tolerate the unknown attempt to create predictability wherever possible, for example, by establishing strict rules in everyday life or at work.

The most complex case is Gen Z, with its unexpected positive correlation pattern: “open, yet anxious.” In our study, this was reflected in a positive relationship between “thin” boundaries and intolerance of uncertainty. One possible interpretation involves the phenomenon of vulnerability through openness. Young people with thin boundaries are likely to be excessively involved in external information flows and less protected from negativity, social problems, and collective anxieties. As a result, they may react more acutely to threats and uncertain factors because their sense of self lacks a robust protective layer. For example, a young person who is constantly present on social media, openly shares personal experiences, and consumes the experiences of others may feel more overloaded and more anxious about the future than a peer who maintains a greater distance and restricts information intake.

This creates a paradox: those who are least isolated from the world may feel the least protected in the face of its uncertainty. Such an interpretation is consistent with Hartmann’s findings that thin-boundary individuals are more vulnerable to certain forms of anxiety and nightmare experiences. Thin boundaries have also been associated with the trait of “insecurity in relationships,” that is, a tendency toward anxious attachment. Taken together, these observations suggest that complete openness, despite its advantages, may also entail disadvantages, such as heightened psychological vulnerability, which was most clearly manifested in the Gen Z sample.

The practical significance of these findings lies in the fact that different generations may require different formats of support and interaction, including in digital environments. This is consistent with evidence on the effectiveness of intergenerational ICT programs in which younger and older participants mutually exchange resources and experience, thereby promoting greater confidence, engagement, and satisfaction with interaction (López Seguí et al., 2019). Likewise, the present results correspond to findings on the important role of digital media in sustaining and expanding intergenerational ties, particularly by maintaining regular communication and improving the quality of contact between members of different age groups (Döring et al., 2022).

The findings also have direct implications for educational practice, especially in online and blended higher education. Psychological boundaries in education are not abstract personality characteristics only; they are manifested in concrete academic situations: whether students feel comfortable keeping cameras on during online classes, how they respond to constant messages in group chats, how they experience deadlines and unclear instructions, how they participate in group projects, and how they negotiate the boundary between home, private life, and academic visibility.

For Gen Z students, thinner and more permeable boundaries may facilitate openness to collaborative digital formats, peer interaction, rapid switching between communication channels, and flexible forms of learning. However, the same boundary configuration may also increase vulnerability to overload, excessive involvement in digital communication, anxiety about external evaluation, and difficulties in protecting personal time and space. In distance learning, this may appear as fatigue from constant online availability, discomfort with compulsory visual presence, tension in group chats, or difficulty separating academic demands from private life.

Intolerance of uncertainty is also educationally significant. In academic settings, uncertainty is present in open-ended tasks, changing schedules, ambiguous assessment criteria, delayed feedback, and the need to choose an individual educational trajectory. Students with higher intolerance of uncertainty may experience

such situations as threatening, which can reduce motivation, increase avoidance, complicate decision-making, and negatively affect academic performance. Therefore, educational environments for Gen Z should combine flexibility with predictability: clear instructions, transparent assessment criteria, staged deadlines, stable communication rules, and psychologically safe opportunities for choice.

The concept of psychological space sovereignty also allows rethinking academic freedom in the digital age. For students, academic freedom is not limited to the choice of courses or learning paths; it also includes the right to regulate one's digital presence, personal learning space, communicative availability, and degree of self-disclosure in educational interaction. From this perspective, "digital conflicts" in higher education often emerge as boundary conflicts: disagreements about cameras, response time, chat etiquette, group workload, public criticism, or the use of personal data and AI tools. Such conflicts should be addressed not only administratively, but also pedagogically, through explicit digital communication protocols, negotiated expectations, and respect for students' personal space.

Thus, the results of the present study indicate that generational differences in personal boundaries and in the ways people experience uncertainty may be important for the design of intergenerational interaction programs. For example, shared projects involving smartphones, joint online training, games, or virtual museum tours may foster empathy and mutual understanding: older adults become acquainted with new media, while younger people come to value the experience of older generations. In this sense, our findings, together with previous research, suggest that such steps may strengthen social ties and reduce intergenerational distance.

Study Limitations

The study is subject to several limitations.

First, the sample was restricted to three cohorts (X, Y, Z) and does not fully capture within-generation heterogeneity, as personal boundaries are also shaped by cultural, familial, and individual temperamental factors. Although diverse, the sample was not statistically representative (e.g., slight overrepresentation of women), which limits generalizability. Future research should incorporate broader and more balanced samples, accounting for gender, cultural context, and socio-demographic variables.

Second, the cross-sectional design precludes definitive interpretation of observed differences as generational, as they may reflect age-related or situational influences. Longitudinal and sequential cohort designs are required to disentangle cohort, age, and contextual effects.

Third, the measurement instruments have inherent constraints. Hartmann's questionnaire, while widely used, is relatively broad and may not fully capture the multidimensionality of personal boundaries; this was partially mitigated by including the Psychological Space Sovereignty measure. The Intolerance of Uncertainty Scale assesses a general dispositional tendency and may not reflect domain-specific variations, which could yield different empirical patterns.

CONCLUSIONS

Empirically, the study established that Generations X, Y, and Z differ primarily in selected parameters of psychological space sovereignty and in the overall "thickness" of personal boundaries. The most pronounced differences were found for sovereignty of territory, sovereignty of possessions, and the integral boundaries indicator. Effect size

estimates confirmed that the most practically meaningful differences concerned the integral boundary score and sovereignty of territory, with small-to-moderate effects, whereas the remaining differences were weaker or statistically non-significant.

Representatives of Gen X were characterized by higher levels of sovereignty, whereas those of Gen Z demonstrated “thinner,” more permeable personal boundaries. At the same time, intergenerational differences in intolerance-of-uncertainty indicators were substantially weaker and did not reach statistical significance for most measures. In addition, the configuration of relationships between personal boundaries and intolerance of uncertainty was found to differ across Generations X, Y, and Z.

The study clarified that personal boundaries constitute a multidimensional construct encompassing physical, emotional, intellectual, and social levels of self-protection. Their function lies in maintaining an optimal balance between closeness and distance, autonomy and interaction. The obtained results provide grounds for interpreting personal boundaries as a psychological system sensitive to differences in socialization and life experience. Theoretical analysis suggests that changes in the social and cultural environment can transform the nature of personal boundaries. In particular, generational affiliation influences how individuals construct barriers or bridges between themselves and the world.

In this context, the higher sovereignty observed in Gen X may be interpreted as an indicator of a more structured and protected organization of boundaries, whereas the “thinner” boundaries of Gen Z may reflect greater flexibility, contextuality, and permeability of personal space. At the same time, the absence of pronounced intergenerational differences in intolerance of uncertainty suggests that this indicator is likely determined less by generational affiliation per se than by current social conditions or other individual factors.

Directions for Future Research

The findings open several avenues for future research. First, it would be useful to broaden the age range and include additional generations, such as the Baby Boomers and Generation Alpha, to provide a more comprehensive picture of the evolution of personal boundaries in the twentieth and twenty-first centuries. Second, cross-cultural comparative analysis would be of considerable interest: do the observed tendencies persist across different countries and cultures, particularly beyond the Western world? This would make it possible to distinguish the influence of age affiliation itself from that of the broader cultural context. Third, longitudinal studies are needed to determine how personal boundaries change over the life course within a single generation; for example, whether the boundaries of today’s Gen Z will “harden” as they grow older or remain relatively flexible, which would provide stronger evidence for the stability of a generational effect.

CONFLICT OF INTEREST

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ARTIFICIAL INTELLIGENCE STATEMENT

In preparing the manuscript, the authors used the artificial intelligence tools DeepL, Grammarly, and Paperpal exclusively for stylistic revision, spell-checking, grammar

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SOCIALIZATION OF MENTALLY IMPAIRED INDIVIDUALS: PERSONAL SOCIAL CORRECTIONAL PROGRAM

СОЦІАЛІЗАЦІЯ ОСІБ З ІНТЕЛЕКТУАЛЬНИМИ ПОРУШЕННЯМИ: ПЕРСОНАЛЬНА СОЦІАЛЬНА КОРЕКЦІЙНА ПРОГРАМА

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ABSTRACT

Purpose. The article introduces a concept and a structural model of personal social correctional program for mentally impaired individuals with the purpose of making their social life as independent as possible.

Method. The article dwells upon a complex of theoretical methods including analysis of scientific literature and the legal framework of Ukraine. It builds up the Program's component structure, and creates social adaptation algorithm based on the International Classification of functioning, disability and health.

Results. A model of an individual program of social and correctional development for persons with intellectual disabilities has been developed, comprising four interrelated components: diagnostics (transition from a deficit-based to a resource-based model),

Мета. У статті представлено концепцію та структурну модель індивідуальної соціально-корекційної програми для осіб з інтелектуальними порушеннями з метою забезпечення максимальної самостійності їхнього соціального життя.

Методи. У статті розкрито комплекс теоретичних методів, зокрема аналіз наукової літератури та нормативно-правової бази України. Обґрунтовано компонентну структуру Програми та розроблено алгоритм соціальної адаптації на основі Міжнародної класифікації функціонування, обмежень життєдіяльності та здоров'я.

Результати. Розроблено модель індивідуальної програми соціально-корекційного розвитку для осіб з інтелектуальними порушеннями, що складається з чотирьох взаємозалежних блоків: діагностичного (перехід від дефіцитарної до ресурсної моделі), комунікативного (впровадження альтернативної комунікації),

communication (implementation of alternative communication), household adaptation (development of self-care skills), and vocational training (pre-vocational training). The study identifies key features of psychological support for families across stages ranging from denial to acceptance, which constitutes a fundamental condition for the program's effectiveness. Practical parent-oriented, autonomy-fostering exercises are integrated into the Program. The role of the territorial community in ensuring supported living services in accordance with current legislation of Ukraine has been substantiated.

Conclusions. The article proves that effective integration of mentally impaired individuals is possible only in the condition of synergy between a science-based program, active family participation and the inclusive community. Personal social correctional development for mentally impaired individuals transforms the approach to disability from a medical to a social one. Further research might prioritize the transition from institutional care to community-based supported living model.

Keywords: family support, inclusive community, international classification of functioning, disability and health, personal development program, social correctional development, social integration, socialization, supported living.

побутово-адаптивного (формування навичок самообслуговування) та професійного (допрофесійна підготовка). Виявлено особливості психологічного супроводу родини на стадіях від заперечення до прийняття, що є базовою умовою успішності програми. У програму також інтегровані вправи, що спрямовані на залучення батьків у процес підвищення рівня самостійності їх дітей із особливими освітніми потребами. Обґрунтовано роль територіальної громади у забезпеченні послуг підтримуваного проживання згідно зі чинним законодавством України.

Висновки. Доведено, що ефективна інтеграція можлива лише за умови синергії науково обґрунтованої програми, активної участі сім'ї та інклюзивної готовності громади. Впровадження індивідуальної програми соціально-корекційного розвитку для осіб з інтелектуальними порушеннями дозволяє трансформувати підхід до інвалідності з медичного на соціально-правовий. Подальші дослідження можуть бути спрямовані на перехід від інституційної підтримки до моделі підтримуваного проживання.

Ключові слова: робота з родиною, інклюзивне середовище, міжнародна класифікація функціонування, інвалідності та здоров'я, індивідуальна програма розвитку, соціально-корекційний розвиток, соціальна інтеграція, соціалізація, підтримуване проживання.

INTRODUCTION

The modern world has changed its attitude to the people with special needs. Deeper into history, people with disabilities had been subjected to isolation and mandatory treatment. Nowadays, this approach has shifted to a social, legit, human rights-based model with all the best options offered by supportive, obstacle-free inclusive surrounding (Shakespeare, 2026).

Nevertheless, socialization of mentally impaired individuals takes top priority positions in list of challenges of social and correctional pedagogy. On the one hand, the principle of inclusion has been internationally declared and acknowledged; in another – mentally impaired individuals have limited opportunities to be fully included into social life. Socialization of mentally impaired individuals is restricted due to their limited cognitive development, obstructed adaptation that often encounter indifferent and unsupportive social surrounding.

The bigger part of personal development programs is represented by formal, theory-based protocols involving a series of complications in practical implementation. Most of these programs are focused merely on academic skills with insufficient pursue of practical competences, vocational training, stress-resistance and psychic stability. Heavy focus on classroom-based learning cuts functional life skills.

Nowadays, it is crucially important to implement a methodology that combines diagnostic, correctional and integration components into an integral personal program of social correctional development. This dynamic program is expected to reflect the changes in the digital and social environment and focus on the idea that self-determination and autonomy are more important than artificial mentor-based overprotective safety.

Both Ukrainian and international scholars actively explore socialization. Skoromna (2024) provided a foundation for psychological and pedagogical support for children with special educational needs. Gorbenko and Khokhlina (2025) highlighted the theoretical bases of role-play correction as a means of adaptation of children with special educational needs. Maslova and Kryvorotko (2025) dedicated part of their research to psychological and pedagogical support of war-impacted internally relocated children with special educational needs. Polyshchuk (2023) focused on training specialists in the social and pedagogical sphere for the prevention of children's deviant behavior.

Foreign scholars have made a considerable contribution to personal programs for mentally impaired individuals. Bertelli et al. (2022) redefined the adaptive behavior. Thompson et al. (2023), Shepley and Waddington (2024). expanded the "Supports Intensity Scales" shifting the focus from personal disabilities to the "instrument kit" these people need to function. The World Health Organization guidelines emphasize the use of the International Classification of Functioning, Disability and Health as the gold standard for rehabilitation (WHO, 2001; Ministry of Health of Ukraine, n.d.; Schmidt et al., 2023).

The main **purpose** of this article is to substantiate a comprehensive conceptual framework and an integral functional model of a personal social correctional program designed to facilitate autonomous socialization of mentally impaired individuals. This research aims to demonstrate a systemic transition from a medical approach to a social model. A four-components algorithm comprising multidimensional diagnostics, communicative instruments, household adaptation strategies, and vocational training is used to demonstrate the model. Furthermore, the article seeks to validate the role of family resilience and parent-centric interventions as key factors for the Program's validity within the context of deinstitutionalization and community-based supported living.

METHODOLOGY

This study includes theoretical research aimed at developing and substantiating a structural-functional model for the social and correctional development of mentally impaired individuals. The research process was grounded on a systematic sequence of scientific methods to ensure their relevance, efficiency and practical value.

The primary methodological framework is based on the systemic-structural approach which made it possible to conceptualize Personal correctional program as an integral system of four functional blocks (diagnostics, communication, adaptation, and vocational training).

Analysis and synthesis were used to examine the current state of socialization practices and to integrate diverse psychological and pedagogical theories into a unified roadmap.

Classification and categorization were used to define the specific stages of parental adaptation and to align them with appropriate pedagogical interventions.

A significant part of the methodology involved a comparative legal analysis of the current Ukrainian legislation (Laws of Ukraine "On Education" (Pro osvitu ..., 2026), "On

Social Services" (Pro sotsialni posluhy ..., 2026)," and "On Rehabilitation of Persons with Disabilities") and international guidelines. A key methodological instrument is the International Classification of Functioning, Disability and Health, which was used as the conceptual foundation for shifting from a medical diagnostic model to a resource-based functional assessment.

Pedagogical modeling method was applied to construct the four-component socialization algorithm. This involved identifying critical issues in the transition from institutional to community-based care, synthesizing cognitive and behavioral techniques into parent-centric exercises, establishing hierarchical links between diagnostic data and practical integration.

The methodology is grounded on the principles of deinstitutionalization and social model of disability. The exercises and the algorithms are based on the "dignity of risk" concept, preferring mentally impaired individual's autonomy and self-determination to traditional overprotective pedagogical patterns. This comprehensive methodological approach ensures that the Program is both scientifically rigorous and ready for implementation within local territorial communities.

RESULTS

Socialization refers to a process and a result of successful integration into society. Socialization of individuals with special needs is not just a process of training behavioral norms and rules, but integration into culture by the means of special terms (Baltremus, 2026). The main obstacle here is malfunction of higher nervous activity which results in malfunction of psychic processes. Thus, processes of socialization are supposed to be carefully planned and coordinated.

We have already mentioned that the purpose of this article is to demonstrate a consequent personal training program for mentally impaired individuals relying on a managed, structured and hierarchical approach. Rather than a static set of instructions, this algorithm functions as a dynamic roadmap evolving alongside the individual's progress. We offer an algorithm consisting of four deeply integrated functional components:

1. *Diagnostics:* Social and correctional approach shifts from typical diagnostics to reliable and efficient functioning. This shift is operationalized by the International Classification of Functioning, Disability and Health, which facilitates a holistic view of the individual through the multidimensional lenses of "Body Functions", "Activity", and "Participation" (Schmidt et al., 2023).

This component is grounded on the Law of Ukraine "On Rehabilitation of Persons with Disabilities in Ukraine" (Zakon Ukrainy pro ..., 2026), and the Cabinet of Ministers of Ukraine resolution #545 "Approval of the Regulation on inclusive resource centers" (Cabinet of Ministers of Ukraine, 2017). It is important to note that the diagnostic component consists of several stages including multidisciplinary comprehensive assessment, ecological screening of social barriers, individual's social passport.

A specialized team normally guides the diagnostic process on the first stage. It consists of a neuropsychologist, special educator, social worker and a therapist (if necessary). This team does not merely record available skills; it identifies the zones of proximal development – the critical connection between what an individual can achieve independently and what they can accomplish with structured support.

The second stage involves assessing the physical accessibility to the local neighborhood (public transport, shopping, recreation areas etc.) and, crucially, the general attitude of

the local community. Individual's social passport serves as a reliable functional instrument detailing not only the individual's critical support needs, but also their unique talents such as high sensory empathy, strong visual-spatial memory or musicality. This passport becomes the primary tool for inter-agency coordination ensuring that all specialists share identical values and plan to achieve the common purpose.

2. Communication: Social Interaction Instruments. This component is based on the Law of Ukraine "On education" (Pro osvitu ..., 2026). Communication is the key to integration. Verbal communication is frequently obstructed among people with intellectual impairments, which results in deeper social isolation or deviant behavior as a tool to express own wants and needs.

The process of social interaction includes several stages: alternative communication, social scripts, emotional intelligence training, and pragmatic speech etiquette. The first stage ranges from low-tech solutions, such as picture exchange and use of tactile objects, to high-tech speech-generating devices and tablets with specialized software. These tools open an opportunity for cognitive connections; individuals with severe intellectual impairments carry on from passive observation to active social interaction.

Social integration stage requires more than just training mentally impaired people to ask for an item or for a service. It requires the ability to navigate social life. Using role-play and video modeling, individuals are taught social scenarios represented by scripted behaviors for high-anxiety units such as medical clinics, public transport, or post offices. These exercises focus on recognizing social cues, managing emotional regulation, and practicing urgent communication (e. g. dialing emergency hotlines or explaining a problem to an ambulance doctor or to a police officer).

Pragmatic speech etiquette sub-component is meant for mentally impaired people with higher verbal potential. The program focuses on the pragmatics of language – the "give and take" of conversation. This includes training how to initiate a dialogue, to select a topic, to understanding non-verbal messages. This type of training helps to reduce social distance between mentally impaired people and the community.

3. Household Adaptation: Foundation of Supported Living. This component is designed to bridge the gap between institutional dependency and community-based autonomy. It aligns directly with the supported living and social adaptation standards defined in the Law of Ukraine "On Social Services" (Pro sotsialni posluhy ..., 2026). This component's purpose is to dismantle the learned helplessness often found in institutional units or overprotective family members. Household adaptation component includes several sub-components, such as functional life skills, safety protocols, and home environment customization.

The first sub-component includes foundation of supported living. Every daily task, from personal hygiene to basic meal preparation, is supposed to be remodeled using the chaining methodology. We utilize backward chaining: mentally impaired individuals are expected to complete the final step of a task first in order to develop own experience of immediate success. The following step is to work the assignment through gradually towards the beginning. These activities are supported by visual schedules and digital timers, which help the individuals learn the concept of time-management and reduce reliance on verbal prompts from caregivers.

Training functional life and basic financial skills includes a set of specialized exercises on domestic and community safety. This involves safe operation of household appliances and clear protocols for emergency situations, e. g. fire or water leaks. As far as the

financial skills are concerned, the program focuses on the correct identification of cash money, use of no-contact payment systems, and the conceptual understanding of budgeting for small, desired purchases.

Third sub-component is based on the recommendation to the family on how to modify the home environment to promote independence, such as using color-coded labels for drawers, visual checklists on exit doors, and sensory-friendly zones to prevent cognitive overload. Mentally impaired individuals are trained to take basic care for themselves within domestic environment either independently or minimally supervised.

4. Vocational Training. This final component proves that meaningful work is the optimal motivation for socialization of adult individuals. It includes a structured daily routine, a sense of self-esteem, and a recognized role within the community. This component is based on the Law of Ukraine “Law of Ukraine on the Basics of Social Protection of Persons with Disabilities in Ukraine” which emphasizes the right to labor and professional development (Pro osnovy sotsialnoi ..., 2026).

Labor activity is the ultimate form of socialization providing mentally impaired individuals with a structure and sense of life. Meaningful contribution and civic identity of mentally impaired individuals comprise pre-vocational training, transition to supported employment, civic engagement and volunteering.

Pre-vocational adaptation is closely connected with simulated workspace. Before entering the open labor market, mentally impaired individuals are invited to take part in “simulated labor environments” within educational or social hubs. Here, they learn critical soft skills including keeping to a schedule, following multi-step instructions, maintaining workplace safety, and collaborating with peers on collective tasks (e.g. sorting, packaging, gardening etc.).

Transition to supported employment facilitates transition from educational or social hubs to inclusive community workshops. This involves job coaching, where a specialist provides on-site support to both mentally impaired people and their prospective employers. We focus on sectors with high success rates for mentally impaired individuals, such as social enterprises (inclusive bakeries, urban farms) and/or “green economy” (recycling, plant care).

Civic engagement and volunteering: the program encourages active volunteering in order to ensure the individuals are not merely consumers of social services. Participation in community clean-ups, animal shelters or local cultural festivals helps transform the public perception of the person from an “object of care” to a “subject of contribution”. The final step in completing social integration is taking active part in community life.

Family is the primary institution of initial socialization. Diagnosis of intellectual disability often triggers a systemic family crisis. Research shows that parental resilience is a key predictor of the individual's success (Grohnick et al., 2023).

Psychological transformation of family is the most critical issue of any personal program of social and correctional development. Family is the primary social ecosystem; however, the diagnosis of intellectual disabilities often shatters the available family structure, impacting a profound emotional reconstruction (Ministry of Social Policy of Ukraine, 2020). As a rule, parents go through the four stages of denial, anger, depression and compliance.

The post-diagnosis parental shock and denial perform the function of protective shield. Upon receiving the initial diagnosis, parents often feel a state of emotional anesthesia or acute cognitive dissonance. This stage is characterized by the doctor-shopping

phenomenon resulting in a relentless, sometimes global search for a “medical miracle” or a diagnostic error to disprove the reality of the intellectual impairment. During this phase, family is highly vulnerable to misinformation. The personal program in this period prioritizes psychological safety over pedagogical goals. Professionals provide empathetic, non-judgmental listening, offering space for the family to process the trauma without the pressure of immediate, high-stakes decision-making.

The energy of resistance transforms into parental anger and aggression. As the reality of the situation permeates the initial denial, a powerful surge of anger often emerges. This aggression may have multi-vectoral directions. This includes accusations of incompetence to medical staff, blaming spouses for genetic factors or lack of support, blaming society at large for its perceived indifference. If left unaddressed, this volatile energy can lead to family disintegration or social isolation of the family. However, if professionally channeled, this stage can be transformed into a powerful vector for advocacy. Sublimated negative energy makes parents ready to protect the rights of mentally impaired individuals and include them into extended community.

Depression is the result of loss of the “ideal child” dream. This stage marks the compliance with the inevitability of lifelong disability and the ruination of idealized image of the child’s future. Parents often experience a sense of existential hopelessness, social isolation, and chronic fatigue, which can evolve into clinical depression. The personal program’s most important part is to convert from purely child-focus to family-resource management. Peer-support groups become the most effective tool here. Cooperation with other parents who have successfully overcome this condition helps to normalize the experience and provides a realistic blueprint for the future.

The partnership stage is grounded mainly on constructive adaptation. This is the final and most resilient stage; parent-professional relationship shifts from one of “expert-to-client” to “collaborative partners”. Parents finally focus on the unique personality of their child, not on the fact of disability. They become co-therapists, using the specialized knowledge to adapt the personal program to everyday reality of the home environment. In this phase, the family becomes more stable and the focus shifts toward maximizing the individual’s autonomy, social integration and the dignity of risk inherent in a self-determined life.

The process of coming through these stages is rarely linear; families may regress during the process of developmental transition or societal crisis. However, a personal program that integrates these psychological realities rather than ignoring them, ensures that home environment becomes a catalyst for socialization rather than a barrier of overprotection.

Personal social and correctional program includes a cognitive-behavioral therapy for parents of mentally impaired individuals. Shifting from catering model cultivating the learned helplessness results in autonomy development. It is important to supplement this article’s theoretical material with reliable correctional exercises for parents. Practical methodology is grounded on applied socialization exercises.

The first exercise we highlight is “Map of a Future Autonomous Life”. The purpose is to cease/stop helicopter parenting. The primary obstacle to autonomy is based on domestic support which is often taken for granted. Parents are instructed to conduct a rigorous audit of ten daily household tasks they currently perform on behalf of the individual (e.g. warming up foods, sorting laundry, or setting a digital alarm).

Once the to-do-list is ready, the family selects one task per month to be fully delegated to the mentally impaired individual. This transition is supported by the creation of a task map represented by a visual, step-by-step instruction manual with photographs of the actual home environment. The parents are expected to step back, moving from physical assistance to verbal prompts and finally to silent observation.

This methodical training helps gain the experience of broader autonomy and independence. Seeing the successful completion of a task parents previously deemed “impossible” for their child serves as a powerful cognitive restructuring tool, replacing parental fear with evidence-based confidence in their child’s potential for supported living.

Second exercise is named “Echo of Choice”. This exercise targets the phenomenon of learned helplessness, where mentally impaired individuals discontinue all the attempts to influence their environment because all decisions are made for them. The “double choice” method is introduced as a key tool in the personal program to foster self-determination.

Throughout the week, parents are supposed to replace imperative commands i.e. “Put on your shoes” with a binary choice: “Do you want to wear your blue sneakers or your brown boots? The critical pedagogical element is to allocate 10-30 seconds to let process the answer. It is crucially important for parents not to repeat the question or give prompts during this time, allowing mentally impaired individuals to make their own preference and give the answer.

Parents use binary choices as the basic tool of this exercise. It helps to reinforce the concept that the individual’s will has a tangible impact on reality. Over time, this builds the neurological connections required for complex decision-making process, shifting mentally impaired individuals from passive recipients of care to active participants in daily routines.

Third exercise uses the 10-second communication rule to help mentally impaired individuals better interact in public. Parents frequently play the role of interpreters, answering questions addressed to the mentally impaired individual before they have a chance to respond. This exercise substitutes this pattern with a relevant direct social interaction between mentally impaired individuals and community members.

In public places, such as a pharmacy, grocery store or post office parents commit to a 10-second silence when a third party (a cashier, a neighbor or an official) addresses the mentally impaired individual. This pause creates the necessary psychological and social space to initiate a response using a preferred method (verbal speech, manual signs or a high-tech AAC device).

This exercise serves as a stress test for social skills within a safe real-world environment. Community members interact with the mentally impaired individuals, thereby reducing social stigma. Positive experience of real-world interaction, even a brief one, considerably increases social confidence and sense of belonging to local community.

The fourth exercise involves training social navigation. Spatial autonomy is the foundation of successful supported living and de-institutionalization. This exercise levels up mentally impaired individuals from guided passengers to independent navigators within their neighborhood.

The exercise is implemented in three mutually-integrated phases. Primarily, parents and mentally impaired individual create a photomap using real-world landmarks (e.g. “the yellow house,” or “the flower shop sign”) rather than street names. Secondly, they perform a joint path-finding mission where mentally impaired individual leads while

parents follow silently. Finally, the individual walks the route alone while being monitored remotely (via GPS or at a pre-arranged distance of 15 meters).

Help card with contact details ensures safety, but the focus remains on the individual's ability to recognize environmental anchors. This exercise helps to build a route of trust not only for mentally impaired individuals who learn how to navigate their community safely, but also for the parents who get more proofs that their children with special need can do safely on their own in public surrounding without permanent supervision. The structure of this article makes it important to add some material on deinstitutionalization and the community infrastructure.

The shift from institutional care to community-based services is a cornerstone of modern social policy. Supported living allows mentally impaired individuals to reside in standard household property with the assistance of a personal aide. The territorial community should be prepared for this in order to guarantee successful integration of these people. Stigma-reduce campaigns may help transform the community from a place of "availability" to a place of "belonging".

DISCUSSION

The interpretation of the findings of this study confirms that the socialization of mentally impaired individuals is not a linear pedagogical process but a multi-dimensional synergy between a well-structured personal program, family resilience and the inclusive community. The results indicate that the shift from the medical model to a social-legal one is only possible when the social passport, derived from the ICF, becomes the functional basis for all the further procedures (WHO, 2001; Ministry of Health of Ukraine, n.d.).

The findings align closely with the work of Bertelly who emphasizes that adaptive behavior rate than cognitive deficit should be taken as the standard for measuring success (Bertelly et al., 2022). Implementation of household adaptation and vocational training components, we observed that social integration includes micro-steps, which confirms Thompson's assertion that support intensity is supposed to be precisely calibrated to the mentally impaired individual's environmental needs rather than their clinical diagnosis (Thompson et al., 2023).

However, this study expands upon the innovative strategies described by Skoromna by introducing specific, parent-centric exercises. While Skoromna focuses on the macro-pedagogical environment, exercises 1 and 2 provide the micro-level tools necessary to combat the learned helplessness often fostered at home. This confronts the outdated defectological approach, which historically favored institutional supervision over the dignity of risk (Skoromna, 2024; Shakespeare, 2026).

In the context of vocational rehabilitation, the results are mounted on Gorbenko's and Khokhlina's research on role play. While Gorbenko and Khokhlina (2025) focus on the skills required for the modern economy, our findings suggest that social and vocational success is equally dependent on soft skills such as communication etiquette and community mobility. The fourth exercise directly addresses the gap between technical training and the actual ability of the individual to communicate and interact within the community, an aspect often overlooked in standard vocational programs.

The analysis of the four stages of parental adaptation provides a critical psychological layer to the personal program. Our observations rely on Grolnick et al. (2023), confirming that parental compliance is the ultimate catalyst for the program's efficacy. We found that without moving past the "denial" phase, even the most sophisticated pedagogical

tools meet internal family resistance, as the parents subconsciously maintain the mentally impaired person's status as an "eternal child" to cope with their own anxiety.

The practical value of these findings is twofold. For practitioners, it suggests that a personal program must be a reliable tool that involves parents as co-developers rather than passive recipients of services. For policymakers, the results support the continued de-institutionalization of social services in Ukraine (Trubavina et al., 2022; Tverdokhliebova & Yevtushenko, 2023), providing a blueprint for how supported living can be operationalized through community-based social practices.

CONCLUSIONS

We conclude that successful socialization of mentally impaired individuals fully relies on the synergy of multi-dimensional pedagogical vectors. Positive socialization results are grounded on personal correction program, family resilience, and the inclusive territorial community. The research confirms that a fundamental paradigm shift from the medical to a social-legal, human rights-based model is one of the basic conditions for modern correctional pedagogy. We represented a structural and functional personal program which serves as a dynamic roadmap focusing on the functional capabilities of mentally impaired individuals.

The integrity of this program is ensured by profound interaction of its four core components. The Diagnostics component, operationalized through the International Classification of Functioning, Disability and Health. This component ensures the transition from a deficit-based IQ-centric diagnosis to a comprehensive functional profile. This shift helps create mentally impaired individual's social passport which identifies the areas of proximal development and serves as the primary tool for inter-agency coordination. The Communication component addresses the critical issue of communicative helplessness by implementing AAC systems and social scripts changing mentally impaired individual's role from a passive observer into an active social participant.

Furthermore, the Household adaptation component effectively bridges the gap between institutional dependency and community-based autonomy. Using backward chaining, visual schedules, and home environment customization techniques, the Program successfully dismantles learned helplessness and fosters essential life skills. The Vocational training component completes this trajectory by providing a transition to supported employment and civic engagement. Transforming the individual's role from an object of care to a subject of contribution by the means of volunteering and meaningful labor is the ultimate motive for achieving a sense of civic identity and self-esteem.

A critical discovery of this study defines the key role of the family ecosystem. The psychological trajectory of parental adaptation going through shock, anger, and depression toward acceptance is a key predictor of the Program's reliability and efficiency. The research highlights that the domestic environment acts as a motivation factor for further socialization. The introduced parent-centric exercises, such as the "Map of a Future Autonomous Life", "Echo of Choice", and "10-Second Communication Rule" supply families with practical micro-level tools for cognitive restructuring. These exercises make it possible for parents to delegate at least part of their custody responsibilities to mentally impaired individuals in order to train their social skills and make them more self-determined.

These results provide a practical blueprint for operationalizing deinstitutionalization within the frames of Ukraine's ongoing social reforms. The transition to community-

based supported living requires not only pedagogical interventions but also systemic stigma-reduction campaigns to rebuild local territorial communities into favorable inclusive environment.

Future researches in this area might explore the integration of innovative technologies i.e., virtual reality into risk-free social training and specialized mobile applications to facilitate school-to-work transition, ensuring that the socialization process remains adaptive to the digital evolution of the modern world.

CONFLICT OF INTEREST

The author declares that there are no conflicts of interest regarding the publication of this paper.

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No artificial intelligence tools were used in the preparation of this manuscript.

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INTERACTIVITY AS A KEY ELEMENT IN DISTANCE ENGLISH LEARNING UNDER MARTIAL LAW: A CASE STUDY

ІНТЕРАКТИВНІСТЬ ЯК КЛЮЧОВИЙ ЕЛЕМЕНТ ДИСТАНЦІЙНОГО НАВЧАННЯ АНГЛІЙСЬКОЇ МОВИ В УМОВАХ ВОЄННОГО СТАНУ: ТЕМАТИЧНЕ ДОСЛІДЖЕННЯ

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ABSTRACT

Purpose. This study investigates how interactive technologies affect motivation, vocabulary acquisition, and the development of communicative skills in distance English language learning under the conditions of martial law in Ukraine. The relevance of this work stems from the rapid evolution of digital tools, an evolution that is reshaping traditional teaching models and creating a need for fresh approaches to activating students' language performance in virtual settings, particularly when traditional classroom instruction is disrupted by war.

Methodology. A four-month study was carried out with 120 students at Admiral Makarov National University of Shipbuilding (NUS), whose English proficiency ranged from A2 to C1. A mixed-methods design was adopted. Quantitative data came from pre- and post-course surveys (using the

Мета. Це дослідження має на меті виявити вплив інтерактивних технологій на мотивацію, засвоєння лексики та розвиток комунікативних навичок у дистанційному навчанні англійської мови в умовах воєнного стану в Україні. Актуальність роботи зумовлена стрімким розвитком цифрових технологій, які трансформують традиційні моделі викладання та потребують нових підходів до активізації мовленнєвої діяльності студентів у віртуальному середовищі, особливо коли традиційне навчання порушене війною.

Методологія. Чотиримісячне дослідження охопило 120 студентів Національного університету кораблебудування імені адмірала Макарова (НУК) із рівнями володіння англійською мовою від A2 до C1. Застосовано змішаний дизайн: кількісні методи (до- та післякурсів опитування за

LLMS and SALC scales) and from automatic activity logs in the learning management system. Qualitative data were gathered through semi-structured interviews with 30 students. Motivation scores, self-assessed language competence, interaction frequency, and vocabulary test results were compared between active and passive users of interactive tools.

Results. A statistically significant increase was observed in motivation from 3.2 to 4.1 on a five-point scale ($p < 0.01$) and in self-assessed language competence, which rose from 2.8 to 3.9 ($p < 0.05$). Students who took an active part in synchronous sessions and asynchronous forums improved their vocabulary test scores by an average of 15% compared to their less active peers. The use of gamified tools such as Kahoot and Quizlet Live was associated with a 17% gain in vocabulary retention. At the same time, several challenges emerged, including technical difficulties reported by 27% of respondents, insufficient digital literacy (22%), and time zone coordination problems (18%). All of these problems were exacerbated by the ongoing war.

Conclusions. Interactivity is more than a technical add-on. It is an important pedagogical factor that encourages active learning and self-development, even in crisis conditions. Platforms that blend synchronous and asynchronous forms of interaction can significantly raise student engagement, improve vocabulary retention, and support the growth of oral communication skills. It is advisable to incorporate interactive methods into distance English courses while taking into account the technical, cultural, and individual characteristics of students. Further research should explore adaptive systems based on artificial intelligence and examine the long-term dynamics of learning outcomes.

Keywords: asynchronous learning, communicative skills development, interactive technologies, student motivation, synchronous interaction, Ukraine, vocabulary acquisition.

шкалами LLMS та SALC, автоматичне логування активності в системі управління навчанням) та якісні методи (напівструктуровані інтерв'ю з 30 студентами). Порівнювалися показники мотивації, самооцінки мовної компетентності, частоти взаємодії та результатів лексичних тестів між активними та пасивними користувачами інтерактивних інструментів.

Результати. Зафіксовано статистично значуще підвищення мотивації (з 3,2 до 4,1 бала за 5-бальною шкалою, $p < 0,01$) та самооцінки мовної компетентності (з 2,8 до 3,9, $p < 0,05$). Студенти, які активно брали участь у синхронних заняттях та асинхронних форумах, покращили результати лексичних тестів у середньому на 15% порівняно з менш активними одногрупниками. Використання гейміфікованих інструментів (Kahoot, Quizlet Live) сприяло підвищенню результатів засвоєння лексики на 17%. Водночас виникло кілька проблем, зокрема технічні труднощі, про які повідомили 27% респондентів, недостатня цифрова грамотність (22%) та проблеми з координацією часових поясів (18%). Усі ці проблеми були загострені війною.

Висновки. Інтерактивність є не просто технічним інструментом, але й важливим педагогічним чинником, що стимулює активне навчання та саморозвиток навіть у кризових умовах. Використання інтерактивних платформ, які поєднують синхронні та асинхронні форми взаємодії, значно підвищує зацікавленість студентів, покращує ефективність засвоєння словникового запасу та сприяє формуванню навичок усного мовлення. Рекомендовано впроваджувати інтерактивні методи в дистанційні курси англійської мови з урахуванням технічних, культурних та індивідуальних особливостей студентів. Подальші дослідження потребують вивчення адаптивних систем на основі штучного інтелекту та довготривалої динаміки навчальних результатів.

Ключові слова: асинхронне навчання, розвиток комунікативних навичок, інтерактивні технології, мотивація студентів, синхронна взаємодія, Україна, засвоєння лексики.

INTRODUCTION

The rapid progress of digital technologies, together with a growing demand for learning environments that can adapt to individual needs, is changing higher education. And foreign language teaching is no exception. One area where interactivity proves particularly useful is in strengthening communicative competence and vocabulary acquisition among students from non-linguistic disciplines: engineering, psychology,

journalism, and finance. Within the Common European Framework of Reference for Languages (CEFR), communicative competence is regarded as central to language proficiency, and interactivity is seen as an essential component in developing that competence. Nevertheless, students outside philological faculties often struggle to master professional vocabulary and oral communication skills. The reasons are familiar: time constraints, limited exposure, and low intrinsic motivation.

Educational systems are progressively adopting digitalisation and interactive learning tools. Interactivity opens up numerous possibilities for transforming language acquisition (Kumar & Vairavan, 2024; Baby, 2025). It enables personalised instruction, instant feedback, automated assessment, and content that can be tailored to student needs and professional contexts (Pais Marden & Herrington, 2022; Xu et al., 2020; Genç & Kirmızıbayrak, 2024). Tools such as video conferencing platforms, discussion forums, gamified applications, and interactive quizzes can support vocabulary learning and speaking practice across a wide range of disciplines from engineering and social sciences to the humanities (Hashmi, 2025; Simon et al., 2025). These challenges have been intensified by the ongoing full-scale war in Ukraine, which has disrupted traditional learning environments and made the need for flexible, technology-enhanced approaches to language education more urgent than ever (Herman et al., 2024). In this context, the role of university teachers has also transformed, requiring a new pedagogical culture to ensure a safe and effective educational process (Tverdokhliebova & Yevtushenko, 2023).

Many Ukrainian universities have adopted hybrid learning models that combine face-to-face instruction with online participation. Admiral Makarov National University of Shipbuilding (NUS) in Mykolaiv has developed a flexible approach. This city experienced active hostilities and remains under constant threat. While on-campus teaching continues for those who can attend in person, students who are abroad or in temporarily occupied territories can join classes synchronously online via video conferencing platforms. This model allows displaced students to remain connected to their academic community, to participate in real-time interaction with peers and instructors, and to access interactive tools such as discussion forums and gamified quizzes. In addition, students facing unstable internet access or time-zone differences may arrange individualised study schedules. This ensures that interactivity, the key focus of this study, remains accessible even under challenging conditions.

Recent scholarship has highlighted the integration of interactive technologies into both English for Specific Purposes (ESP) and general English instruction (Wei, 2022). Systematic reviews (Genç & Kirmızıbayrak, 2024) indicate a clear shift away from traditional methods towards interactive systems that can address diverse student needs (Shadiev & Yang, 2020). At the same time, research also notes that while interactivity supports individualised learning, it raises concerns regarding technical accessibility, digital literacy, and the quality of feedback provided (Grant, 2022).

A review of the recent literature reveals several important findings about the role of interactivity in distance language learning. Nguyen and Nguyen (2023) concluded that self-regulated learning in an online environment depends directly on the level of course interactivity. The more opportunities a student has to interact, the greater their capacity for self-organisation and independent work. This suggests that interactivity not only facilitates language acquisition but also helps develop metacognitive skills. Wu and Nian (2021) pointed out that digital literacy can be a critical barrier in interactive distance ESL teaching. Without prior training in the use of interactive tools, the effectiveness of

interaction drops noticeably especially among older adult students. In an experimental study, Kumar and Vairavan (2024) demonstrated that gamification directly affects both motivation and retention in language learning. They reported that gamified applications increased regular attendance by 40% compared to traditional online methods.

Hashmi (2025) observed that the digital influence on students' identity in multilingual educational contexts creates both opportunities and challenges. Interactive platforms, he argued, need to take students' cultural characteristics into account to achieve maximum effectiveness. Grant (2022) found that willingness to communicate (WTC) in online EFL classrooms increases significantly with synchronous video conferencing compared to asynchronous formats. Regular video interaction, he noted, reduces language anxiety. Wei (2022) indicated that technology-based education correlates closely with increased intrinsic motivation for learning English as a foreign language. Interactive technologies, in his view, act as a catalyst for autonomous learning. Shadiev and Yang (2020) concluded that the most effective approaches combine both synchronous and asynchronous forms of interaction, and that regular feedback is critically important. Genç and Kırmızıbayrak (2024) showed that Web 2.0 interactive platforms can significantly improve communicative skills provided they are implemented methodologically correctly.

The full-scale Russian invasion that began on 24 February 2022 fundamentally altered the educational landscape in Ukraine. According to the Ministry of Education and Science of Ukraine, more than 2,000 educational institutions were damaged or destroyed during the first year of the war. Millions of students and teachers were forced to relocate internally or flee abroad. In response, Ukrainian universities rapidly transitioned to fully distance or blended learning formats, often with limited preparation time.

At NUS, located in Mykolaiv, a regional capital less than 100 kilometres from the front line, the challenges have been particularly acute. The city experienced repeated missile and drone attacks, with damage to university buildings and prolonged interruptions to electricity and internet connectivity. Students and faculty have had to adapt to learning under air raid alerts, often continuing classes in bomb shelters or relocating to safer regions.

Herman et al. (2024) notes that distance education in Ukraine has evolved from a supplementary tool to a primary mode of instruction. However, the adoption of interactive methods remains uneven across institutions due to disparities in infrastructure, teacher training, and student digital literacy. This study, conducted at NUS between September and December 2024, captures a period when martial law was still in effect, and the university community had developed coping mechanisms but continued to face significant disruptions. The findings therefore reflect not ideal conditions but the reality of crisis-driven digital transformation, which arguably makes them more valuable for institutions facing similar challenges worldwide.

On a practical level, students in non-linguistic fields need to acquire discipline-specific vocabulary and communication skills to function effectively in professional settings. In the present case, engineering students require terminology for technical documentation and project discussions; finance students need to understand terms such as "asset-backed securities" and "risk assessment"; psychology students need language that allows them to describe emotions and cognitive processes; and journalism students need fluency in media discourse and ethical communication (Young, 2015).

Integrating interactivity into distance language teaching is not without its challenges.

Unequal access to technology, variability in teachers' digital skills, difficulties in coordinating synchronous activities across time zones, and concerns about student engagement and assessment integrity, all of these remain real problems (Shadiev & Yang, 2020). In Ukraine, despite increased digitalisation driven by the pandemic and the war, the adoption of interactive methods remains uneven across institutions (Herman et al., 2024). At NUS, specific challenges have included: (a) students displaced to different time zones within and outside Ukraine, making synchronous scheduling difficult; (b) frequent power outages limiting access to devices and the internet; (c) psychological stress and fatigue reducing sustained engagement; and (d) heterogeneous digital literacy levels among both students and faculty.

At the same time, national reforms are increasingly emphasising the importance of ICT integration into non-linguistic curricula. Pilot EFL courses in technical and economic universities are testing interactive instruction, and early results are promising in terms of vocabulary development and communicative competence. Collaboration with psychology and engineering faculties has demonstrated that interactivity has the potential to support motivation, metacognitive skills, and professional identity.

Despite the abundance of studies, several gaps remain. First, most research has focused on either synchronous or asynchronous interactivity in isolation, rather than examining how the two complement each other. Second, there is limited empirical evidence on the optimal balance between different types of interaction for students at different proficiency levels. Third, few studies have provided practical, actionable recommendations for educators who are designing distance courses. Fourth, cultural and contextual factors that influence the effectiveness of interactive strategies have received insufficient attention. Fifth, and most critically for this study, there is very little research on interactive distance language learning conducted under active wartime conditions, where infrastructure is unreliable, participants may be displaced, and psychological stress is high.

The **purpose** of this study, therefore, is to examine how interactive technologies can enhance motivation, vocabulary acquisition, and the development of communicative skills in distance English language learning under martial law, using the specific case of NUS in Mykolaiv, Ukraine. It explores the interactive tools used in EFL instruction, identifies pedagogical strategies, compares outcomes across different proficiency levels (from A2 to C1), and outlines both the benefits and the limitations of interactive vocabulary learning in a crisis context. The research offers evidence-based recommendations for educators, curriculum designers, and policy-makers working in disrupted environments. By analysing diverse student profiles and instructional models, the study contributes a framework for integrating interactivity into EFL teaching in both Ukrainian and international educational contexts that may face similar emergencies.

METHODOLOGY

Design

A mixed-methods design was chosen. Why? Because the study needed both numbers and narratives. Quantitative data would show changes in motivation and language scores. Qualitative data would explain why those changes happened – or didn't happen (Lamb & Arisandy, 2019). This design is particularly appropriate for research conducted under unstable conditions, as it allows triangulation of findings and captures contextual factors that pure quantitative methods would miss.

Participants

The sample included 120 adults. Their ages ranged from 18 to 45 (mean = 28.3). Ninety-four were men, twenty-six were women. All were first- or second-year bachelor's students or first-year master's students in the field of knowledge "F Information Technologies" and were taught English by the author as part of their regular foreign language course. Their proficiency levels, measured by the CEFR, varied from A2 to C1. This focus on a single disciplinary field allowed the study to examine interactivity effects within a homogeneous professional vocabulary context.

At the time of the study (September-December 2024), all participants were residing in Ukraine, though 23 (19.2%) were internally displaced from the temporarily occupied territories of Kherson, Donetsk, or Luhansk regions. An additional 12 participants (10.0%) had returned to Mykolaiv after a period of displacement earlier in the war. This context is essential for interpreting both the challenges and the resilience observed in the data.

Who could take part? We had four inclusion criteria:

- age 18 or older;
- active enrolment as a first- or second-year bachelor's student or first year master's student in the field "F Information Technologies" at NUS, with the author as their English instructor;
- stable internet and a computer capable of video conferencing;
- no previous experience with interactive distance EFL courses.

We also had exclusion criteria:

- incomplete pre- or post-course questionnaires;
- missing more than 30% of synchronous sessions;
- withdrawal of informed consent.

Group Assignment

Stratified random sampling was used. This ensured fair representation across proficiency levels (A2, B1, B2, C1), gender, and age groups. A computer-generated sequence assigned participants to one of two groups.

The control group (n = 40) received traditional online instruction. That meant recorded lectures and text-based assignments – no structured interactive components.

The experimental group (n = 80) took courses with integrated interactive tools: video conferencing, discussion forums, and gamified quizzes.

Everyone signed a written informed consent form. We promised confidentiality, anonymity, and the right to withdraw at any time without penalty.

Procedure

The study ran for four months – one academic semester. Data collection happened in three stages.

Stage 1: Literature review. We analysed publications from 2001 to 2025, searching Scopus, Web of Science, and Google Scholar. The focus was on peer-reviewed articles about interactivity, student engagement, and English acquisition in distance or blended settings.

Stage 2: Quantitative data. Before and after the course, participants completed two validated questionnaires: the Language Learning Motivation Scale (LLMS) and the Self-Assessment of Language Competence (SALC). Motivation was measured on a 5-point Likert scale. Participants also rated their own speaking and writing skills. Both instruments were translated into Ukrainian using a forward-backward translation procedure and pilot-tested on 15 students not in the main sample (Cronbach's $\alpha = 0.87$ for LLMS, 0.84 for SALC).

The learning management system automatically logged interaction data – frequency, duration, and type of participation. This included synchronous activities (Zoom, live chat) and asynchronous ones (Moodle forums, Kahoot!, Quizlet Live). Vocabulary was tested weekly with 10-item quizzes tied to course content. All quizzes were automatically scored, and only students who completed at least 12 of 16 weekly quizzes were included in the final analysis ($n=112$ out of 120).

Stage 3: Qualitative data. We conducted semi-structured interviews with 30 students: 15 from the experimental group and 15 from the control group. Each interview lasted 20-30 minutes. With permission, we recorded and transcribed them verbatim. The goal was to understand subjective experiences: what helped, what didn't, what surprised them. Interviews were conducted in Ukrainian, according to participant preference, and translated into English for analysis by a professional translator.

Statistical analysis

We analysed quantitative data using descriptive statistics (means, standard deviations, frequencies) and inferential statistics.

Paired-sample t-tests compared pre- and post-course motivation and self-assessed proficiency within each group. Independent-sample t-tests compared changes between groups. Significance was set at $\alpha = 0.05$. Effect sizes were calculated with Cohen's d .

For vocabulary scores, we used repeated-measures ANOVA to examine within-subject effects over the four months. Pearson correlation coefficients checked whether more interaction (from LMS logs) meant larger vocabulary gains. Additionally, a one-way ANOVA was conducted to compare vocabulary gains across proficiency levels (A2, B1, B2, C1), revealing no significant interaction between proficiency and treatment effect ($F(3,108)=1.42$, $p=0.24$), suggesting that interactivity benefits students across all levels.

All analyses were performed using SPSS 26.0 and JASP 0.16.4.

Qualitative Analysis

Interview transcripts were analysed using thematic content analysis. We followed Braun and Clarke's (2006) six-phase framework. Two researchers coded the transcripts independently. Inter-coder reliability was 0.84 (Cohen's kappa). Disagreements were resolved through discussion.

Ethical Considerations

The study followed the Helsinki Declaration (2008 revision). Ethical approval came from the Institutional Review Board of Admiral Makarov National University of Shipbuilding (Protocol No. 12/2024, 15 September 2024). All participants gave informed consent before enrolment. Given the wartime context, special attention was paid to ensuring that participation did not add to psychological distress. Participants were reminded that they could skip any question or withdraw without providing a reason.

RESULTS

Quantitative Findings

The numbers showed a clear increase. Motivation scores rose from 3.2 before the course to 4.1 after it (5-point scale, $p < 0.01$). Self-assessed language competence also went up – from 2.8 to 3.9 ($p < 0.05$). These results match earlier work on the motivational effects of interactivity in online learning (Lin et al., 2016). Notably, the effect size for motivation (Cohen’s $d = 0.94$) was large, indicating that the observed difference is not just statistically significant but educationally meaningful.

Table 1
Student Motivation and Self-Assessed Proficiency (Pre- and Post-Course)

Metric	Pre-course	Post-course	Change	p-value
Motivation Score (1–5 scale)	3.2	4.1	+0.9	< 0.01
Self-assessed Speaking	2.8	3.9	+1.1	< 0.05
Self-assessed Writing	3.0	4.0	+1.0	< 0.05

Source: developed by the author.

Engagement data told a similar story. Students who actively joined synchronous sessions and posted regularly on asynchronous forums made bigger gains. Frequent forum contributors improved their vocabulary test scores by 15% on average compared to less active peers (Simon et al., 2025; Krish et al., 2011).

Figure 1
Vocabulary Test Score Improvement by Engagement Level



Source: developed by the author.

What does this mean? Regular interaction matters – not just for motivation but also for retention and long-term skill building. In the wartime context, this finding is particularly significant because it suggests that even when external conditions are unstable, structured interactive activities can maintain and even enhance learning outcomes.

Comparison Between Experimental and Control Groups

To isolate the effect of interactivity, we compared the experimental group ($n=80$, interactive tools) with the control group ($n=40$, traditional online instruction). The experimental group showed significantly larger gains in motivation ($\Delta = +1.0$ vs. $\Delta = +0.5$ in control, $t(118)=3.42$, $p<0.01$) and vocabulary test scores ($\Delta = +14.8\%$ vs. $\Delta = +6.2\%$, $t(118)=4.15$, $p<0.001$). Self-assessed speaking competence improved by 1.3 points in the experimental group compared to 0.6 points in the control group ($t(118)=2.98$, $p<0.01$). These differences confirm that it is interactivity rather than online delivery that drives

the observed improvements.

Qualitative Findings

The interviews added detail. Participants valued real-time communication with instructors and peers. It helped reduce the isolation that often comes with distance learning (Shadiev & Yang, 2020; Wei, 2022). Many students said interactive quizzes and gamified activities were especially motivating. These tools let them test their progress instantly. Assessments became learning opportunities. Confidence grew.

One participant from the experimental group (male, 22, IT) stated:

When the air raid siren goes off, I can't focus on a recorded lecture. But a live Kahoot quiz keeps my attention. It's competitive, it's fast, and I forget about the war for 15 minutes (participant interview).

Another (male, 35, displaced from Kherson) noted:

The discussion forums helped me feel connected. I'm in a rented room in Lviv, my classmates are in Mykolaiv, Odesa, even Poland. But we share vocabulary tips. We correct each other's sentences. It's not perfect, but it's community (participant interview).

Conversely, a control group participant (female, 41) expressed frustration:

We just watched videos and answered text questions. No one checked if I understood. No one asked my opinion. After three weeks, I stopped trying (participant interview).

These contrasting experiences underscore the pedagogical value of interactivity beyond mere content delivery.

Challenges

Not everything went smoothly. Technical problems like poor connections, platform glitches sometimes got in the way. Students with weaker digital literacy skills reported more frustration and lower engagement.

Table 2

Reported Challenges by Participants

Challenge	% of Respondents
Technical connectivity issues	27%
Low digital literacy	22%
Time zone coordination	18%
Lack of peer response	15%
Overwhelming course load	10%

Source: developed by the author.

Notably, technical connectivity issues (27%) were significantly higher than in pre-war studies conducted at the same institution (estimated at 12-15%), reflecting the impact of damaged infrastructure and power grid instability. Several participants reported that they had to complete quizzes using mobile hotspots or during brief windows when electricity was available.

One interesting pattern: although women constituted only 22% of the sample (n=26), they were disproportionately more likely to mention time management difficulties in asynchronous environments (73% of female participants vs. 41% of male participants). Male students more often said they lost interest in forum discussions (54% of male participants vs. 31% of female participants). This suggests interactive tools may need tailoring for different groups (Nykyporets, 2022), and that gender differences persist even in male-dominated IT cohorts. Additionally, displaced participants (n=23) reported higher levels of all challenges compared to non-displaced peers, particularly time zone coordination (35% vs. 14%, $\chi^2=5.82$, $p<0.05$) and technical issues (39% vs. 24%, $p=0.08$, not significant but trending).

Gamification Effects

Gamified tools such as Kahoot, Quizizz, Quizlet Live had a clear impact. Students who used them scored 17% higher on vocabulary quizzes than those who stuck with conventional exercises. What made the difference? Instant feedback and competition. Both kept interest alive and encouraged repetition (Young, 2015).

Figure 2
Vocabulary Quiz Scores: Gamified vs. Non-Gamified Users



Source: developed by the author.

Further analysis revealed that the gamification effect was strongest among lower-proficiency students (A2-B1), who improved by 22% compared to 12% among higher-proficiency students (B2-C1). This suggests that gamified tools may be particularly valuable for bridging gaps when students have uneven prior preparation. This scenario is common in wartime education.

Feedback and Personalisation

Timely, constructive feedback mattered a lot. When instructors responded within 24 hours, motivation scores rose by 0.8 points on average. With delays of more than 48 hours, the effect was smaller (Teo et al., 2018). In the wartime context, however, timely feedback was not always possible due to power outages and air alerts. The experimental group used automated feedback from gamified tools as a partial substitute, which participants rated as “helpful but not as good as teacher feedback” (mean 3.7/5 vs. 4.3/5 for human feedback).

Customised tasks also helped. Students who got content tailored to their interests and levels showed more persistence. About 76% of them finished the course. In non-personalised tracks, only 58% did. This backs up what Genç and Kirmızıbayrak (2024) argued: we need more adaptive, personalised learning environments.

Simulation and Emotional Resilience

Interactivity also supported language immersion through simulations. Virtual role-plays, video conversations, and collaborative writing mimicked real-world communication. Students felt better prepared for actual conversations in English after such activities,

especially simulated interviews and debates (Chametzky, 2021).

Emotionally, those who regularly joined group discussions reported less anxiety and more enjoyment. That's important because language anxiety is known to hold students back, especially in speaking. Lin et al. (2016) emphasised social presence and emotional support in digital classrooms. Our findings reinforce that. In post-course interviews, 73% of experimental group participants agreed or strongly agreed that interactive sessions "helped me feel less alone during the war," compared to only 41% of control group participants.

Limitations of the Study

Several limitations should be acknowledged. First, the study lasted only four months (one academic semester). While this was sufficient to observe short-term gains in motivation and vocabulary, long-term retention and transfer of skills remain unexamined. Second, the sample (n=120) was relatively small and drawn from a single university, limiting generalisability to other Ukrainian institutions or international contexts. Third, self-assessed proficiency measures, while validated, may be subject to response bias (e.g., social desirability, overconfidence). Fourth, the study did not include objective pre- and post-course speaking assessments (e.g., recorded oral interviews rated by blind evaluators), which would have strengthened claims about communicative competence development.

Fifth, the wartime conditions, while central to the study's relevance, also introduced uncontrolled variables such as power outages, displacement, and psychological distress. These factors may have affected outcomes in ways that cannot be fully isolated. More specifically, the war context had a measurable effect on self-assessment and engagement. Many participants reported that air raids and unstable internet connections made it difficult to follow a regular learning schedule, which lowered their engagement metrics (e.g., missed synchronous sessions, late submissions).

In addition, self-assessed language competence appeared to be influenced by psychological stress rather than by actual language gains alone. Several interviewees rated their own speaking and writing lower than their quiz results would suggest, attributing this to war-related fatigue and anxiety. Thus, the war context may have suppressed both self-reported confidence and consistent participation, independently of the interactive tools used.

Sixth, the sample was predominantly male (78%) and limited to students in information technology disciplines. This gender and disciplinary imbalance may affect the generalisability of findings to female-dominated or humanities-based cohorts. Future research should include more balanced samples across genders and fields of study. Finally, the control group (traditional online instruction) was smaller than the experimental group (40 vs. 80), which may have reduced statistical power for between-group comparisons. Future studies should aim for balanced groups and include longer follow-up periods.

Peer Tutoring

Peer tutors or more experienced students made a difference too. In classes where peer tutoring was encouraged, writing scores were 10% higher on average. Also, 68% of students in peer-tutored environments rated their experience as "very satisfactory" – compared to 49% in standard formats.

DISCUSSION

Overall Implications

The key takeaway is that interactivity isn't a luxury in online English education. It's a necessity (Lin et al., 2016). It promotes autonomy, reduces isolation, encourages repetition, and enables contextualised practice. The result is more dynamic, effective, and inclusive learning environments. Under martial law, these benefits are amplified: interactivity provides structure, social connection, and psychological relief in addition to language gains.

However, these benefits only appear when infrastructure, teacher training, and student support are in place. Institutions need to invest not just in tools but also in teaching strategies and capacity building. Recent research confirms that effective teaching methods, particularly those tailored for large student groups and integrating digital tools, are critical for success in modern university settings (Holubnycha et al., 2025). Courses must be designed with clear interactivity goals. Educators need skills to manage both technology and engagement. In the Ukrainian context, this also means preparing for disruptions: having offline-ready materials, using low-bandwidth alternatives (e.g., text-based forums instead of video), and building flexibility into assessment schedules.

Only then can distance English learning realise the full potential of interactivity. Tailored approaches that consider cultural backgrounds, technological access, and pedagogical frameworks are strongly recommended.

Most earlier studies examined interactivity in stable, peacetime conditions. They focused on general motivation, vocabulary retention, or engagement without the added pressure of a full-scale war. This study, by contrast, was conducted in a real-world wartime setting where power cuts, air raids, and displacement were not hypothetical risks but daily realities. These conditions affected not only access to technology but also learners' self-assessment and emotional state. Unlike previous work that treated external disruptions as controllable variables, this study shows that war-related stress can suppress self-reported confidence and engagement independently of the interactive tools used. Thus, the findings contribute new knowledge about how interactivity functions in extreme, non-standard educational contexts, specifically, where learners' basic sense of safety and stability cannot be taken for granted.

Comparisons with Other Studies

Our results look similar to what others have found. Grant (2022) reported a higher willingness to communicate among Japanese students who used interactive storytelling platforms. So interactivity seems to help across cultures – though local adaptation still matters. Culture shapes preferences. Students from collectivist societies (East Asia, for example) tended to favour synchronous, teacher-guided sessions. They valued authority and group harmony. Individualist students (from Northern Europe, say) preferred self-paced forums and peer collaboration. Anderson and Rivera-Vargas (2020) were right: digital pedagogy needs to be context-sensitive. In our Ukrainian sample, preferences were mixed but leaned towards synchronous interaction (61% preferred live sessions over forums), which may reflect both the cultural value placed on direct communication and the wartime need for real-time connection and emotional support.

What the Results Mean

Regular interaction matters, not just for motivation but also for retention and long-term

skill building. Deeper engagement leads to more meaningful language learning. In the wartime context, this finding is particularly significant because it suggests that even when external conditions are unstable, structured interactive activities can maintain and even enhance learning outcomes. The 15% advantage for actively engaged learners and the additional 17% boost from gamification are practically significant. This is equivalent to moving up one sublevel on the CEFR scale for many learners. The contrasting experiences from interviews underscore the pedagogical value of interactivity beyond mere content delivery. Learners value real-time interaction with peers and instructors because it reduces isolation. This is a real problem in distance education.

Practical Recommendations

Interactivity cannot be an afterthought. It must be built into course design from the start. That means combining technology (gamified apps, collaborative platforms) with pedagogy (dialogic teaching, peer feedback). Teacher training is equally critical. One session is not enough. Ongoing support is required. In Ukrainian universities, this implies embedding digital pedagogy into faculty development programmes and creating peer-support networks for instructors facing similar wartime challenges. The Ukrainian case suggests a hybrid model may work best under crisis conditions. This model is primarily synchronous for community building and includes asynchronous options for flexibility. When rapid teacher response is impossible, for example during power outages, automated feedback from gamified tools can serve as a stopgap. However, it is not a full replacement.

Future Research

Future research should explore several directions. Adaptive AI systems could personalise interaction based on individual learner profiles. Immersive technologies like VR and AR offer new possibilities for experiential learning. Longitudinal studies are needed to see whether short-term gains last. Comparative research across regions and educational levels would help establish best practices. Specifically for wartime or crisis contexts, researchers should investigate the following: (a) low-bandwidth interactive strategies for learners with unreliable internet; (b) the role of peer support networks in maintaining motivation during displacement; and (c) the long-term psychological and linguistic effects of learning under chronic stress.

CONCLUSIONS

Three main findings stand out.

First, motivation and self-perceived proficiency went up. Not a little. Self-assessed speaking and writing improved from 2.8 to 3.9 and from 3.0 to 4.0 respectively. Both changes were statistically significant ($p < 0.01$ and $p < 0.05$). Learners simply do better when they are actively engaged through different formats. Second, vocabulary retention gets a real boost from high engagement techniques. Nguyen and Nguyen (2023) made a similar observation. Students who take part in online discussions or interactive quizzes remember more words. Why? Deeper processing and repetition. Interaction facilitates both. The result is stronger memorisation and better transfer of skills. Third, qualitative data from interviews tell the same story. Learners value real time interaction with peers and instructors. It reduces isolation. That feeling of being alone in distance education? It is a real problem. Interactive tools help. Gamified platforms like Kahoot and Quizlet Live do more than just improve vocabulary retention. They make learning enjoyable. Less stressful too.

But there are problems. We cannot ignore them. Culture also matters. Learners from collectivist backgrounds preferred synchronous, structured interaction. Those from individualist cultures liked asynchronous flexibility. No universal model exists. Course designers have to adapt. Demographics and cultural context should guide their choices. Feedback timing is another factor. When teachers responded within 24 hours, satisfaction went up significantly. So educators need more than technical skills. They need to be responsive. Supportive communication matters.

What does this mean for practice? Several things. Interactivity cannot be an afterthought. It must be built into course design from the start. That means combining technology (gamified apps, collaborative platforms) with pedagogy (dialogic teaching, peer feedback). Teacher training is equally critical. One session is not enough. Ongoing support is required. Future research should explore several directions. Adaptive AI systems could personalise interaction based on individual learner profiles. Immersive technologies like VR and AR offer new possibilities for experiential learning. Longitudinal studies are needed to see whether short term gains last. Comparative research across regions and educational levels would help establish best practices. The benefits outweigh the limitations. Thoughtful application can transform distance education into something dynamic, effective, and inclusive.

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CONFLICT OF INTEREST

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ARTIFICIAL INTELLIGENCE STATEMENT

Artificial intelligence tools were used solely for language editing and stylistic improvement.

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WORK INTEGRATED LEARNING AND ENGINEERING EDUCATION: MERGING ACADEMIC LIBRARIES INTO AN ECOSYSTEM OF SUPPORT

ІНТЕГРОВАНЕ З РОБОТОЮ НАВЧАННЯ ТА ІНЖЕНЕРНА ОСВІТА: ОБ'ЄДНАННЯ
АКАДЕМІЧНИХ БІБЛІОТЕК В ЕКОСИСТЕМУ ПІДТРИМКИ

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ABSTRACT

Purpose. South African higher education institutions are increasingly under pressure to produce employable graduates. While technical skills are predominantly the focus in engineering education, transitioning to the workplace poses peculiar challenges. Soft skills commonly refer to a set of predetermined behaviors considered necessary in a professional work context. The latter is a subset of the affective domain in education, which encompasses the broader context in which transitioning from campus to the workplace occurs. The purpose of this study stems from a notable lack in the literature on considering the affective domain when planning workplace preparedness programs for South African engineering students.

Мета. Південноафриканські заклади вищої освіти все більше перебувають під тиском підготовки працездатних випускників. Хоча технічні навички є переважно основною темою інженерної освіти, перехід до робочого місця створює особливі труднощі. Гнучкі навички зазвичай відносяться до набору визначених моделей поведінки, які вважаються необхідними в професійному робочому контексті. Це є підґрунтям емоційної сторони в освіті, яка охоплює ширший контекст, коли відбувається перехід з університету до робочого місця. Мета цього дослідження впливає з великої нестачі літератури щодо врахування емоційної галузі під час планування програм підготовки фахівців до робочого місця для південноафриканських студентів-інженерів.

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Methodology. Using Schlossberg's Transition Theory as a framework, this study employed an interpretive literature review to examine South African engineering students' transitioning to Work-Integrated Learning. The literature was analysed according to Schlossberg's theoretical framework, comprising a perusal of situational contexts during a transition, personal strengths and characteristics, institutional support structures, and coping strategies employed by individuals.

Results. The findings of the present study confirm that preparing engineering students for the WIL component should acknowledge the entire life transition process rather than relying on a generic list of "soft skills". In responding to a current lack of context-specific student preparation initiatives in South Africa, this study explores the role of academic libraries in facilitating digital storytelling as an emerging narrative pedagogy.

Conclusions. Work-Integrated Learning offers higher education institutions an opportunity to strengthen their reputations and success by showcasing students who have received sound industry preparation. A narrow conception of the affective domain in engineering education may disadvantage students and place an undue burden on industry mentors and relevant academic staff. Academic libraries are well-positioned to facilitate the contextualization of soft skills within the broader transition-to-workplace by enabling digital storytelling, while allowing engineering students to inform context-specific curricula for student preparation initiatives in South Africa.

Keywords: academic libraries, digital storytelling, engineering, higher education institutions, mental health literacy, narrative pedagogy, South Africa, work integrated learning.

Методологія. Використовуючи теорію переходу Шлосберга як основу, це дослідження застосувало інтерпретаційний огляд літератури для вивчення переходу південноафриканських студентів-інженерів до навчання, інтегрованого з роботою. Літературу було проаналізовано відповідно до теоретичної бази Шлосберга, що включає вивчення ситуаційних контекстів під час переходу, особисті сильні сторони та характеристики, структури інституційної підтримки та стратегії подолання труднощів, що використовуються окремими особами.

Результати. Результати цього дослідження підтверджують, що підготовка студентів-інженерів до компонента «навчання, інтегроване з роботою» має враховувати весь процес життєвого переходу, а не покладатися на загальний перелік «гнучких навичок». У відповідь на поточну відсутність контекстуально-орієнтованих ініціатив з підготовки студентів у Південній Африці, це дослідження вивчає роль академічних бібліотек у сприянні цифровому сторітеллінгу як новітній наративній педагогіці.

Висновки. Навчання, інтегроване з роботою, пропонує закладам вищої освіти можливість зміцнити свою репутацію та досягти успіху, демонструючи досягнення студентів, які отримали ґрунтовну галузеву підготовку. Вузьке розуміння емоційної галузі в інженерній освіті може поставити студентів у невідгідне становище та призвести до надмірного навантаження на галузевих наставників та відповідний академічний персонал. Академічні бібліотеки мають гарні можливості для сприяння контекстуалізації гнучких навичок у межах ширшого переходу до робочого місця, забезпечуючи цифровий сторітеллінг, водночас дозволяючи студентам-інженерам формувати контекстуально-орієнтовані навчальні програми для ініціатив з підготовки студентів у Південній Африці.

Ключові слова: академічні бібліотеки, цифровий сторітеллінг, інженерія, заклади вищої освіти, грамотність у галузі психічного здоров'я, наративна педагогіка, Південна Африка, інтегроване з роботою навчання.

INTRODUCTION

Work Integrated Learning

Work-Integrated Learning (WIL) is a pedagogy that integrates theoretical knowledge and practical skills through authentic workplace practices. In the context of engineering education, this pedagogy is characterised by a short period allocated to students to

master technical and affective skills simultaneously (Soobramoney & Govender, 2025). Increasingly, studies point to the need for WIL experiences to be carefully crafted with a view to enhance students' workplace readiness.

Work-Integrated Learning, as a concept, involves a triad comprising Higher Educational Institutions (HEIs), university students, and industry mentors (Soobramoney & Govender, 2025). The combination of theory and hands-on experience is a common denominator across all WIL definitions. The term "Work Integrated Learning" is interchangeably used to describe "experiential learning", "work placements", "internships" and "cooperative education". This paper defines WIL as, "An educational approach consisting of authentic work-focused experiences as an intentional component of the curriculum". The transition from university to the workplace is considered to be a crucial developmental period for students, during which they move from highly structured academic environments to increasingly complex labour markets (Eneje et al., 2025; Soobramoney & Govender, 2025). Life transitions in general refer to events that result in, "changed relationships, routines, assumptions, and roles" (Anderson et al., 2012).

The Affective Domain of Engineering Education

The affective domain of learning, also known as the emotional domain, is a well-recognized feature of learning theory. It encompasses students' attitudes, values, motivations, and interests (Korsten et al., 2021). The latter manifests in behaviour, and has a large effect on engineering students' professional development (Korsten et al., 2021; Soobramoney & Govender, 2025). The affective domain of learning is often misunderstood and conflated with soft skills. While these terms are closely related concepts (since both focus on non-technical attributes), the affective domain focuses on internal attitudes and values, while soft skills focus on observable behaviour.

When characteristics associated with the affective domain are ignored, students may well be less prepared for the workplace on an emotional level (Korsten et al., 2021). The affective domain, therefore, continually needs revisiting and upgrading to keep engineering students engaged and motivated during the WIL transition (Korsten et al., 2021). It is also important that universities and workplaces acknowledge the importance and consequences when students' affective experience diminish, which affects emotional intelligence, motivation, sense of belonging, collaboration, confidence, curiosity, persistence, and professional ethics (Korsten et al., 2021; Visser & Law-van Wyk, 2021).

This paper explores the research question: "How can narrative pedagogy be used in South African academic libraries to support the transitioning to the WIL component of engineering education?"

BACKGROUND

The literature indicates a mismatch between the aspirations of engineering students, industry employers, and academic staff regarding WIL (Soobramoney & Govender, 2025). Exploring this mismatch is considered an important point of departure in this study and should provide valuable insights. In addition, this exploration aligns with Schlossberg's Transition Theory, which underscores the importance of understanding the broader context in which engineering students find themselves as they transition to WIL (Anderson et al., 2022; Schlossberg, 2008).

Contradicting expectations often point towards systemic barriers that gradually influence each party's performance and motivation. Exploring the disconnect between students', employers', and academic staff's expectations could be a logical starting point

for understanding the challenges that engineering students face during the WIL process. Misalignments and unmet expectations often lead to apprehension and anxiety, which, in turn, affect work performance. The build-up of pressure due to unmet expectations also raises fundamental questions about the long-term emotional consequences for all parties involved in the WIL component of engineering education.

Expectations of Engineering Students

Engineering students are afforded various opportunities during the WIL component of their studies to apply theoretical knowledge in practice. Additionally, WIL offers opportunities related to future employability, authentic work experience, and a platform for new collaborations. Studies, however, suggest that some engineering students in South Africa feel unprepared upon entering the workplace and report dissatisfaction with the workplace preparation offered by academic institutions (Molele, 2024; Soobramoney & Govender, 2025). While engineering students also perceive workplaces as unsupportive of their learning (Garraway & Friedrich-Nel, 2026), opportunities to gain workplace experience in South Africa are not guaranteed.

Many engineering students report a paucity of opportunities for gaining work experience through university placement programmes, a situation that is compounded by challenging economic conditions. Consequently, dissatisfaction with extended waiting times for industry placement is increasing among engineering students (Soobramoney & Govender, 2025). This is a significant concern in a low-income country such as South Africa, where many students come from disadvantaged backgrounds, and are facing multiple challenges related to economic pressures, limited resources, high unemployment rates, and intense competition for placements (Soobramoney & Govender, 2025).

Expectations of Industry Mentors

There are multiple definitions and perceptions recorded related to the competencies required from productive employees. Often, skills relevant to adapting to rapid technological change, emotional resilience, and good interpersonal skills are high on employers' wish lists (Dipitso, 2023). During WIL, engineering students often enter fully functioning and productive workplaces. However, a study in South Africa found that employers of engineering WIL students seem dissatisfied with their punctuality for work and absenteeism, which result in delayed projects and lost productivity (Soobramoney & Govender, 2025).

Apart from financial and logistical challenges, extant literature in South Africa is scarce in terms of exploring the actual reasons behind absenteeism among engineering students during WIL (Mapaling et al., 2024). Nonetheless, the effect of this on staff morale cannot be underestimated in the workplace. While industry mentors acknowledge the validity of students' expectations regarding development, training, and gaining workplace experience, they simultaneously report heavy workloads, lack of educational experience, and limited resources (Garraway & Friedrich-Nel, 2026; Soobramoney & Govender, 2025). A need exists for employers to develop appropriate processes for on-the-job learning and mentoring. Sadly, the literature suggests that some engineering students have become sceptical of industry mentors, which has a negative effect on their professional behaviour (Soobramoney & Govender, 2025).

Expectations of University WIL Project Leaders

University lecturers play a vital role in providing emotional and psychological support to students, who are regarded as valuable assets for prospective industry employers (Kankam & Baffour, 2021; Mostert et al., 2025). Engineering students, in this regard, often consider committed lecturers as role models, and report that they benefit from their encouragement (Mostert et al., 2025). Regrettably, studies also report on inexperienced WIL project leaders and infrequent visits by university staff to monitor students' workplace performance (Soobramoney & Govender, 2025).

While academic staff may expect engineering students to progress during the WIL component of their studies, some realities might be out of their control. This is especially relevant in low-income countries, such as those in sub-Saharan Africa, which are plagued by various systemic hurdles that affect infrastructure and resources. The latter have a direct impact on the monitoring and support of students in the workplace during the WIL process. Given the different expectations and realities among students, universities, and industry mentors, nagging doubts persist about whether students are indeed sufficiently prepared for the workplace with the skills needed for long-term workplace success.

METHODOLOGY

A non-empirical research design grounded in an interpretive literature review methodology was employed to provide a snapshot of current issues relevant to South African engineering students' transitioning to WIL. The researcher moved beyond a descriptive summary of the literature to interpret, synthesise, and contextualise themes. In this regard, the present study set out to generate conceptual insights into the research problem, while also identifying patterns and gaps in existing studies. Rather than aiming for exhaustive coverage or summarising of the literature, interpretive literature reviews offer opportunities for innovative reconceptualisations (Cresswell & Creswell, 2023).

Literature Identification and Selection

An analysis of extant literature revealed that studies tend to follow a typical trajectory, in which core observations are categorised across multiple stages of the study. The "theming" of information is appropriate for a wide range of qualitative studies, and represents a strategic choice when interrogating sources, considering the research question, and the study's goal (Creswell & Creswell, 2023). Schlossberg's Transition Theory defines a transition as, "any event, or non-event, which results in changed relationships, routines, assumptions, and roles" (Schlossberg, 2008). This theoretical lens guided the thematic analysis process in this study into the 4S categories: *situational* context associated with the transition, personal *strengths* and characteristics, *support* received during the transition, and coping *strategies* available (Schlossberg, 2008).

The literature review process consisted of five stages. Firstly, a timeframe was set for searching, screening, analysing, and reflecting on the research question's context. Thereafter, electronic databases and citation indexes were employed to identify relevant studies. Databases included Web of Science and Scopus, SAGE, PubMed, JSTOR, Taylor & Francis, Ebsco-Host, Google Scholar, and ScienceDirect. The following keywords were used to locate relevant literature: "work integrated learning", "engineering", "student*", "Higher Education", "universit*", "academic librar*", "affective", "soft skills", "transitioning", "South Africa", and "Africa*". Criteria for inclusion required that texts had to be published between 2021 and 2025, should be relevant to a South African and sub-Saharan context,

and had to be aligned with the present study's central research question. Studies conducted beyond South Africa were consulted in this study to complement, confirm, challenge, or elaborate on findings from local studies.

A summary of key papers informing this study, interpreted according to Schlossberg's Transition Theory, is presented in Table 1 below, listed by publication date. This audit trail of key information sources consulted aligns with best practices to improve trustworthiness by enabling easier traceability of sources.

Table 1

Key studies in an engineering Work Integrated Learning context aligned to Schlossberg's Transition Theory

Publication date and author/s	Focus and location of the study	Schlossberg's Transition Theory categories
2025, Mostert et al.	Resilience of engineering students (SA)	Personal strengths, coping strategies
2025, Eneje et al.	WIL and engineering education (Sub-Saharan Africa)	Institutional support & social networks
2025, Soobramoney & Govender	Challenges for engineering students during WIL (SA)	Situational context, institutional support & social networks, coping strategies
2024, Meintjies	Mental well-being of Science students (SA)	Personal strengths, Institutional support & social networks,
2024, Mapaling et al.	Engineering students and academic resilience (SA)	Personal strengths
2024, Molele et al.	Gaps in managing WIL programs (SA)	Situational context, institutional support & social networks,
2023, Mashiyane et al.	Engineering education (sub-Saharan Africa)	Institutional support & social networks
2023, Dipitso	Engineering students and employability (SA)	Institutional support & social networks
2023, Bantjes et al.	National survey on the well-being of university students (SA)	Situational context, coping strategies
2021, Korsten et al.	Engineering students and academic stress (SA)	Situational context, Personal strengths, coping strategies
2021, Eloff et al.	Engineering lecturers supporting emotional well-being (SA)	Institutional support & social networks
2021, Kankam & Baffour	Academic Libraries promoting Mental Health Literacy (Ghana)	Personal strengths, Institutional support & social networks, coping strategies
2021, Visser & Van Wyk	Emotional well-being among university students (SA)	Situational context, coping strategies

Trustworthiness of Findings

Strategies aimed at ensuring trustworthiness were grounded in recognised principles of qualitative research. The credibility of the findings was ensured through the researchers' years of experience with engineering students and academic lecturers, as well as through daily observations, informal discussions, and involvement. Detailing the research process and procedures, while providing the rationale for interpretations and the inclusion of literature, contributed to the dependability of the findings. In addition, the researcher ensured dependability through transparency by following the prescribed standard practices for literature review studies, grouping related concepts into categories and then into broader themes, thereby helping to form a coherent interpretation of the research problem. Thick descriptions and the extensive examination of selected literature through stating implicit assumptions as well as opposing arguments addressed the future transferability of findings in this study.

LITERATURE REVIEW AND DISCUSSION

Schlossberg's Transition Theory emphasises the importance of understanding the situational context relevant to life's transitions (Anderson et al., 2022; Schlossberg, 2008). The following section interrogates and interprets core elements relevant to engineering students' transitioning into the WIL component of their studies.

From Campus Certainty to a Transition Shock

During WIL, students exchange a nurturing educational environment for the workplace where self-directed learning is required. This new professional environment requires students to transition on various levels. Most often, relocation to a different geographic area poses challenges, compounded by efforts to achieve financial independence and adapt to a new workplace social context. Transitions are often described as "culture shocks", a term that illustrates the effects on students as they attempt to adapt to complex processes and procedures within a new environment. Mashiyane et al. (2023) refer to a "transition shock," in which the WIL experience is often associated with a psychological and social disruption, leading to feelings of insecurity and a heightened sense of self-doubt. The literature suggests that engineering WIL students are often unprepared for the complexity of workplace problems.

Employability and the "Incompatible Psychological Contract"

Rousseau (1995) refers to an "incompatible psychological contract," which implies a failure of two sets of expectations to coincide, illustrating a tacit deal that entails unspoken imprints and is considered realistic if it is not broken. Upon entrance to WIL, employers often assume that students have the psychosocial capacity to manage organisational dynamics and maintain motivation under pressure.

This is especially concerning in the engineering discipline, where workspaces valorise endurance, excessive working hours, and constant availability as measures of dedication and professionalism. These expectations might come at a cost, as career transitions are often associated with a considerable risk of burnout among engineers due to the highly pressurised working environment. When a psychological contract is violated, this may lead to disengagement and lower commitment. An intentional redesign of this "psychological contract" through open dialogue about shared expectations is therefore critical in the workplace.

The paradox of Preparation

The Engineering Council of South Africa (ECSA) plays a crucial role in establishing standards for engineering education and practice in the country. In this context, engineering programmes are regulated by professional bodies that inform curricula (Soobramoney & Govender, 2025). The importance of technical competencies in engineering education is uncontested and underpins all aspects of students' training. Increasingly, however, studies question the rationale for focusing disproportionately on technical skill sets, as these do not fully determine future employment success.

A paradox arises when students enter the WIL component of their qualification and realise that a structure specifically designed to prepare them for the world of work suddenly reveals their lack of emotional preparedness. This is the case even when the development of soft skills has been incorporated into engineering curricula. It could be argued that engineering students often seem to be at the mercy of academic staff and university systems that lack sufficient awareness and understanding of their holistic development and workplace preparation (Soobramoney & Govender, 2025).

The Narrative of "They are Unprepared"

The "ill-prepared graduate" has become a popular narrative in discussions of student employability and workplace readiness. Employers often interpret students' behaviours as a lack of motivation, a poor work ethic, or a lack of resilience. These interpretations are further compounded when communication styles and cultural norms differ in professional workplace contexts, such as those found in South Africa. Professionalism is, after all, culturally and contextually constructed, with behaviours that are seen as inappropriate in one organisational cultural setting being entirely acceptable – if not highly desired – within another. Many of these perceived challenges could, therefore, be viewed as developmental gaps rather than as deficits that may not develop gradually. Therefore, expectations of immediate workplace capability should be replaced with approaches aligned with progressive development milestones over time.

IDENTITY FORMATION AND GENERATIONAL FRAMES

The notable transition from student to aspirant professional engineer signals an identity-related transition. Transition theories emphasise the importance of personal strength during significant life transitions, which require rebuilding meaning, identity, and belonging (Schlossberg, 2008). For engineering students, the internal labour of adapting one's self-concept to professional roles in a diverse work environment is frequently undervalued. It is therefore important that all parties involved acknowledge the importance of professional identity development of engineering students for a workplace context.

This is especially relevant in a context where employees are expected to work together and share company goals through teamwork, daily interactions, and engagement. Increasingly, this happens in the context of multigenerational workforces. During the WIL component of their studies, students are required to learn how to translate academic behaviours into effective work behaviours while collaborating effectively with people with diverse skills, personalities, and backgrounds. Industry mentors, however, admit to encountering immature "youth mindsets" in South African workplaces, which can lead to a host of non-work-related challenges (Soobramoney & Govender, 2025).

A popular explanation as to why students are struggling to adapt to the workplace is rooted in generational stereotypes, depicting them as less motivated, overly reliant on

technology, and lacking a sense of time (Slabbekoorn, 2026). Workplaces across disciplines have gradually accepted a culture of 24/7 availability, which occasionally raises concerns about students' perceived "lack of stamina". Gen Z is a term commonly used to describe "digital natives," and refers to a generation that grew up entirely in the digital age. Currently, most students in HEIs fall in this category, confirming that by 2030, Gen Z will take up a significant share of the working population in South Africa.

Consequently, educational programmes are increasingly shaped by this younger generation's unique communication styles, learning preferences, and workplace expectations (Slabbekoorn, 2026). Notably, this generation seeks a workplace culture that fosters open communication, collaboration, and psychological safety. This phenomenon points toward a possible shift in values and expectations regarding sustainable work environments and suggests that many students enter the workforce with specific expectations regarding work-life balance (Slabbekoorn, 2026). Failure to acknowledge these perceptions towards the workplace may lead to a continuous framing of students' struggles as attributable to their generation.

The Soft Skills Controversy

Employers increasingly value both hard (technical) and soft (interpersonal) skills of employees in contributing to organisational goals (Soobramoney & Govender, 2025). The term "soft skills" is closely related to the affective domain, which has become widely used to gauge preparedness of students for the 21st century. Soft skills typically refer to written and oral communication skills, critical thinking skills, time management, collaboration, teamwork, problem-solving, project management skills and creativity. South African studies on soft skills among engineering students reported poor time management, which often spills over into concerns about punctuality and meeting deadlines during the WIL period (Soobramoney & Govender, 2025).

Additionally, engineering students in South African workplaces seem to struggle to resolve disagreements and conflicting viewpoints, particularly due to a lack of self-articulation skills needed for respectful, constructive argument (Mapaling et al., 2024; Soobramoney & Govender, 2025). Rather than considering the absence of these soft skills as indicative of deficiencies in engineering students' abilities, this absence indicates wider areas of support required, which should commence before entering the WIL component.

Not all soft skills, however, can be mastered with equal ease or in a predetermined amount of time. Developing emotional intelligence, perseverance, and the ability to adapt to change requires a longer trajectory to develop (Soobramoney & Govender, 2025). Resilience under pressure is increasingly identified as important in the workplace, yet it remains unexplored in engineering education in South Africa (Mostert et al., 2025). Despite the importance of such skills for employability, the affective domain is frequently taken for granted rather than intentionally developed in university settings.

MENTAL HEALTH AND WELL-BEING OF ENGINEERING STUDENTS

Mental health and well-being are positively linked to the affective domain in education. Improved mental health is often associated with a better quality of life, where one's emotions are understood and managed through effective coping skills, emotional regulation, and increased help-seeking behaviour (Anderson et al., 2022; Schlossberg, 2008).

The prevalence of mental illness, however, is on the rise across the globe, with many people being unaware that they have a diagnosable disorder. High levels of severe

mental disorders have been recorded among undergraduate students across disciplines in South Africa, with key challenges including mood-related disorders such as anxiety and depression (Bantjes et al., 2023; Korsten et al., 2021). While studies increasingly urge South African HEIs to prioritise mental health and wellness education and awareness, this has not been a priority among policymakers, and a need exists for interventions related to experiences of depression, anxiety, substance use, and suicide or attempted suicide (Meintjies, 2024).

Engineering students in HEIs have been identified as a vulnerable group in terms of challenging mental health (MH) conditions. Despite growing concerns about these students' mental health and well-being, this topic remains poorly researched (Korsten et al., 2021). MH conditions are commonly diagnosed according to the internationally recognised Diagnostic and Statistical Manual for Mental Disorders (DSM). While the DSM is a well-recognised reference source, some SA populations also prefer to obtain traditional explanations for mental illness conditions. Sadly, many South Africans do not have access to health services and tend to normalise serious mental conditions by labelling most conditions as mere "stress" (Kometsi et al., 2020). Consequently, people tend to wait too long before seeking help for their condition.

Engineering Students and Help-Seeking Behaviour

The importance of coping skills and self-regulation in the context of stressful life events is increasingly emphasised in the literature and on social media platforms. Self-reported coping skills among engineering students often include a preference for talking to peers or family members. The latter seems, by far, the preferred help-seeking option rather than contacting professionals with a view to address mental health challenges (Andrews et al., 2020). In South Africa, high levels of stigma often deter individuals from disclosing mental health concerns (Kankam & Baffour, 2021; Kometsi et al., 2020). Stigma among engineering students has also been recognised as a major barrier to seeking mental health support (Andrews et al., 2020). Concerningly, engineering students often perceive high stress levels and mental health challenges as essential parts of the engineering culture (Mostert et al., 2025). This "culture of suffering" is passed on to incoming students through interactions, advice, instructors, and departmental norms.

Engineering Students and Workplace Stress

University students across disciplines in South Africa show high rates of anxiety and panic disorders (Bantjes et al., 2023; Korsten et al., 2021). In addition, diagnosable conditions such as depression among engineering students are on the increase. Anxiety as a condition can be a result of frequent worries about competence, performance, and workplace acceptance. Life transitions are often considered "anxiety-inducing" events associated with burnout and imposter syndrome as students strive to navigate stressful environments (Slabberkoorn, 2026). Furthermore, the term "imposter syndrome" is often used to describe a psychological pattern where high-achieving individuals doubt their skills and capabilities, leading to anxiety. For engineering students, imposter syndrome manifests as persistent feelings of falsity, despite evidence of success and competency (Chakraverty, 2020).

Sustained high stress levels, also, contribute to unhealthy workplaces that often expect employees to navigate intense competition among themselves. South African engineers report overall feelings of fear as they enter unfamiliar workplace environments, face industry expectations, and are expected to work with modern equipment and technology (Soobramoney & Govender, 2025). In addition to anxiety, reports confirm high

rates of depression across universities in South Africa (Bantjes et al., 2023; Meintjies, 2024). A high risk of suicidal ideation among engineering students further exacerbates the risk of suffering from depression (Korsten et al., 2021; Soobramoney & Govender, 2025).

Loss and Its Emotional Toll

The transition from a relatively unstructured environment to a structured workplace is often associated with a strong sense of loss and relates to various challenges experienced during this period. One of the most underexamined and stigmatised aspects of students' transition is grief. Grief, as a term, refers to, "psychological distress associated with loss, which often accompanies fear of more losses to come" (Holly & Slaton, 2025). In the context of this study, grief is associated with non-death losses, which often evoke strong emotions relevant to new life transitions accompanied by loss of supportive social environments. A strong link exists between a sense of belonging and academic performance (Andrews et al., 2020). In this regard, losses can also include disillusion, failure, and disappointment (Holly & Slaton, 2025).

A build-up of feelings associated with loss subsequently affects students' well-being, resilience, and professional conduct. Common reactions to feelings of loss include social isolation, which gradually affects physical and mental health. Loss and grief are still largely unexplored in the engineering WIL literature. Further exploration is needed by encouraging engineering educators to be thoughtful about what is being lost and by whom (Andrews et al., 2020; Holly & Slaton, 2025). The onus of transitioning to the workplace can therefore not be placed solely on a student's resilience and/or adaptation skills; it should also consider systemic issues and how organisations and institutions support students.

FINDINGS

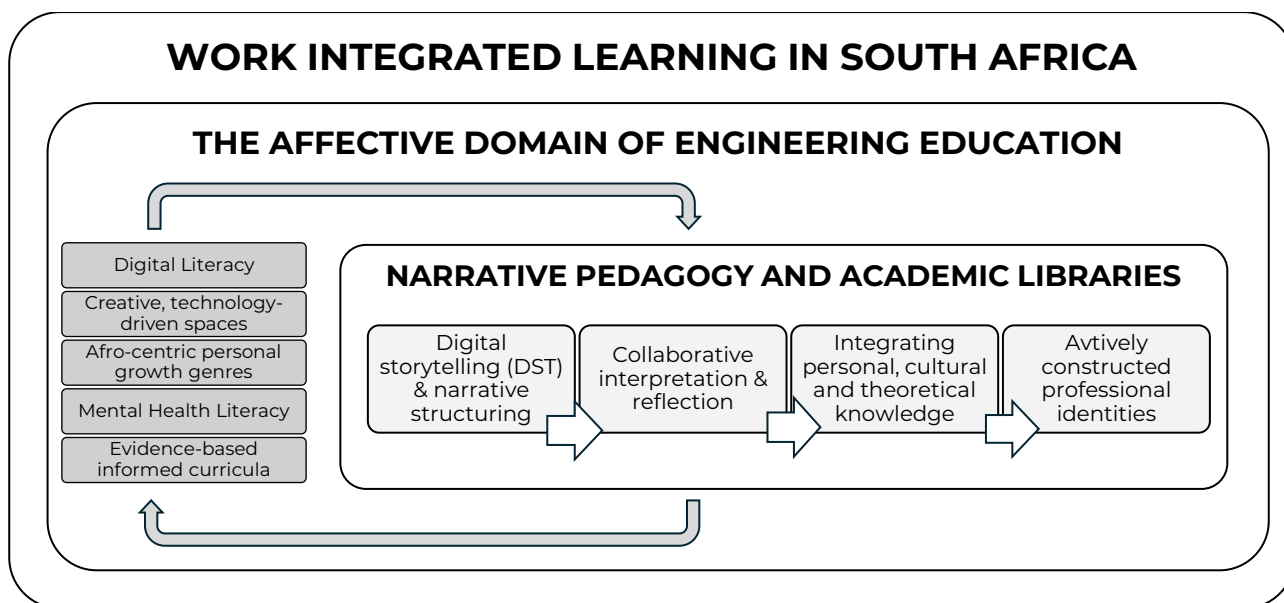
The transition to Work Integrated Learning is complex and multidimensional. In South Africa, engineering students' voices are scarce regarding their perceptions of the broader situational context in which the transition to WIL takes place. Literature also suggests that engineering students are not prepared in alignment with the framework outlined in Schlossberg's transition theory and lack support for the various personal and social influences at play during the WIL transition. This notion has also been confirmed in a recent study confirming a current vacuum in engineering student preparation programs in South Africa (Garraway & Friedrich-Nel, 2026).

Narrative pedagogy is gradually recognized as an innovative approach in Science, Technology, Engineering, and Mathematics (STEM) (Kumar et al., 2026). Across African cultures, this pedagogy offers benefits in boosting resilience, self-reflection, and behavior change. This study highlights ample opportunities for academic libraries to contribute to the debate on engineering student preparedness by building on existing liaisons with faculty, core roles in information and digital literacy, and advocacy for mental health literacy. Figure 1 depicts shifting from a broad context in which academic libraries should be situated to a more specific frame that emphasizes supporting the affective domain in engineering education.

An additional frame elaborates on how academic libraries can expand narrative pedagogy by facilitating digital storytelling. New roles and opportunities are suggested for academic libraries to become involved in this context, which are discussed in the next paragraphs.

Figure 1

Roles proposed for academic libraries in facilitating narrative pedagogy in engineering education.



Firstly, the findings suggest an ecosystem of shared responsibility in Higher Education Institutions. This entails an ecosystem of support within universities, which can help to build the technical workforce needed to drive future economic growth. While the challenges of engineering WIL students are typically assumed to be personal, a closer look at the reality of the situation suggests a possible structural mismatch between industry needs and students' current preparation in HEIs.

This misalignment is crucial to understand and refocus graduate preparedness as a collective, systemic issue rather than an individual failure. Instead of focusing on whether engineering students are “ready,” a more appropriate question could be: “To what extent are systems aligned so that readiness can develop over time?” This calls for awareness that academic libraries, academic staff, employers, policymakers, and students themselves need to come together to address the mismatch—a role beyond the capability of any single entity or group, but rather a collective responsibility grounded in shared understanding.

While literature and policies identify the partnership between educational institutions and industry employers as a critical area in WIL, literature on expanded collaboration *within* academic institutions is scarce. This is especially relevant to academic libraries, and the notion that workplace readiness should be co-produced. Libraries on the African continent are therefore required to lead students in becoming content creators, which involves constructing logically coherent arguments through digital media.

Content creation and Digital storytelling (DST) are central to a narrative pedagogy approach that utilizes technology to clarify complex and abstract concepts (Cabrera et al., 2025). Academic libraries are therefore required to upskill in facilitating digital storytelling techniques by simultaneously leveraging established technological infrastructures to inform evidence-based services for engineering students.

Secondly, the findings suggest the importance of mental health literacy education for engineering students. A key function for libraries across the globe is emerging: that of raising awareness of, and education on Mental Health Literacy (MHL). The latter is a

multidimensional construct signalling a working knowledge of mental health and wellness. Jorm et al. (1997) define MHL as, “knowledge and beliefs about mental disorders which aid in their recognition, management or prevention”. Consequently, MHL is positively associated with improved help-seeking, resource-acquisition behaviours, self-care, and coping skills (Carvalho et al., 2022). Increasingly, academic libraries are urged to make strong commitments in encouraging students to report mental health issues and seek support (Andrews et al., 2020) and to capitalize on the high premium students place on their neutrality on campus.

Additionally, academic libraries should expand the quantity and genres of information resources. The mandate of academic libraries in universities is to support faculty information needs by acquiring relevant resources and providing information literacy training tailored to those needs. This mandate is outlined in policies that govern most services offered (Kankam & Baffour, 2021). Findings suggest that academic libraries should increasingly be prepared to support students' emotional aspects of student transitions and their effects (Kankam & Baffour, 2021).

The benefits of information resources for stimulating expressive writing, journaling, bibliotherapy, and self-improvement reading materials have been well documented. For academic libraries to fulfill the new roles proposed in this study, future acquisitions should include Afro-centric genres to address self-regulation, improve interpersonal relationships, and manage stress, such as working manuals and self-help resources (Carvalho et al., 2024).

Thirdly, findings confirm a golden opportunity for academic libraries to develop psychologically safe spaces for creative mood-regulating activities to improve self-regulation, coping skills, and mental health. The literature shows that university students increasingly expect academic libraries to create neutral, dedicated wellness spaces to foster a sense of belonging and de-stress.

Safe spaces are particularly important for WIL students who are vulnerable to censure from both workplace supervisors and university lecturers (Garraway & Friedrich-Nel, 2026). Increasingly, makerspaces are utilized in academic libraries, where physical spaces are equipped with digital tools that foster creativity, informal knowledge sharing, learning, and critical thinking among engineering students.

Additionally, moving beyond primarily Western-based approaches toward collective social well-being is necessary. In a South African context, academic libraries are well-positioned to encourage creative expression by leveraging the locally developed Mmogo Method™. Here, non-experts can facilitate and accommodate students' socially constructed perceptions and artefacts of mental health (Baart & Roos, 2022). This method aligns with the recognised need to incorporate physical and group activities into mental health and wellness events. These expectations align with emerging trends where library spaces are reinvented to create informal environments that encourage creative expression.

IMPLICATIONS FOR HIGHER EDUCATION INSTITUTIONS

The WIL component of engineering education entails significant responsibilities and dedication in the South African context, which is marked by limited capacity and financial constraints (Soobramoney & Govender, 2025). The combination of academic libraries and engaged faculty can help to ameliorate system-level challenges, underscoring the need for broader cooperation within HEIs (Andrews et al., 2020). An appreciation for incremental growth, supported by exposure designed to develop

sustained professional success, is receiving wider global acceptance. Such approaches oppose a deficit-based approach, in which engineering students are expected to be professionally competent upon entering the WIL component of their studies.

RECOMMENDATIONS FOR FUTURE RESEARCH

While this literature study leaned towards public higher education institutions in South Africa, the rapidly increasing number of private institutions offering specialised, industry-focused qualifications is a salient area for future studies. It is therefore recommended that future case studies examine the application of narrative pedagogy in South African academic libraries. In addition, studies should explore different engineering fields individually, such as mechanical, civil, and electrical engineering, and compare them.

LIMITATIONS OF THE STUDY

Findings and recommendations yielded by this interpretive literature review did not aim to provide a comprehensive or statistically representative account of the available literature across higher education institutions and private institutions offering engineering qualifications in SA.

CONCLUSION

While the affective domain of engineering education is considered critical for long-term career success, the literature suggests it is often poorly aligned with preparing engineering students for WIL. A current narrow conception, mainly focused on a predetermined list of “soft skills” in engineering education, could constitute a disservice to engineering students and overburden industry mentors in SA.

The importance of accounting for the broader context in which the transition to WIL takes place supports the notion that academic libraries serve as conduits between engineering students and faculty through facilitating digital storytelling techniques. Hereby enabling engineering students to become content creators for future WIL preparation programs aligned with multigenerational and multicultural workplaces in South Africa. A more nuanced understanding of student preparedness for WIL can only be achieved if all parties involved understand and prioritise this broader conception of transitioning from campus to the workplace.

CONFLICT OF INTEREST

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No artificial intelligence tools were used in the preparation of this manuscript.

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LOCAL GAME-BASED INSTRUCTION AND LITERACY DEVELOPMENT AMONG TANZANIAN ENGLISH LEARNERS: A PRE-POST CORRELATIONAL STUDY

ІГРОВЕ НАВЧАННЯ ТА ФОРМУВАННЯ ГРАМОТНОСТІ
СЕРЕД УЧНІВ ТАНЗАНІЇ, ЯКІ ВИВЧАЮТЬ АНГЛІЙСЬКУ МОВУ:
ПОРІВНЯЛЬНЕ КОРЕЛЯЦІЙНЕ ДОСЛІДЖЕННЯ

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ABSTRACT

Purpose. This study examined the relationships between reading and writing skills and the predictive role of reading subskills in writing performance before and after a local games-based literacy intervention. The study focused on primary school pupils with low baseline literacy levels and adopted a post-method pedagogical perspective.

Methodology. A quasi-experimental pre-test-post-test design involving two experimental schools and one control school was employed in the study. Pupils utilised a local games-based English instructions for five-months. Pre- and post-test data were analysed with Pearson correlations and multiple regression to examine reading-writing relationships and predictors of writing performance.

Results. Prior to the intervention, reading and writing skills were highly interdependent across multiple subskills. After the intervention, a distinguished transformation emerged. The correlations between reading and writing measures weakened, while relationships within the writing domain strengthened. Moreover, the reading comprehension emerged as the sole significant predictor of all writing outcomes, with the variance explained by reading subskills decreasing substantially for letter writing (from 63.1% to 19.9%) and word writing (from 47.5% to 12.7%). In contrast, text writing remained strongly associated with reading comprehension.

Conclusions. Local games-based instruction enhanced autonomy in foundational writing skills while maintaining the role of comprehension in complex tasks. The study supports culturally responsive, game-based pedagogies, aligned with post-method principles, as a way to transform reading-writing relationships in resource-limited contexts.

Keywords: early literacy, game-based instruction, literacy intervention, reading-writing relationship, writing and writing skills.

Мета. Це дослідження вивчало взаємозв'язок між навичками читання та письма та прогностичну роль навичок читання в успішності письма до та після ігрового навчання з розвитку грамотності. Дослідження було зосереджено на учнях початкової школи з низьким базовим рівнем грамотності та застосувало пост-методологічну педагогічну перспективу.

Методологія. У дослідженні було використано квазіекспериментальний дизайн «до-після» тестування, що охоплював дві експериментальні школи та одну контрольну школу. Учні використовували ігрові завдання з англійської мови протягом п'яти місяців. Дані до- та після тестування були проаналізовані за допомогою кореляції Пірсона та множинної регресії для вивчення взаємозв'язків між читанням та письмом, а також умов успішності письма.

Результати. До експерименту навички читання та письма були дуже взаємозалежними між собою. Після експерименту відбулася помітна трансформація. Кореляція між показниками читання та письма послабшала, тоді як зв'язки в галузі письма зміцнилися. Більше того, розуміння прочитаного тексту виявилось єдиною значущою умовою усіх результатів письма, причому дисперсія, пояснена суттєвим зниженням навичок читання, виявилася для письма буквами (з 63,1% до 19,9%) та письма словами (з 47,5% до 12,7%). Натомість, написання тексту залишалося тісно пов'язаним з розумінням прочитаного тексту.

Висновки. Навчання на основі локальних ігор покращило автономність базових навичок письма, зберігаючи при цьому роль розуміння прочитаного тексту у складних завданнях. Дослідження підтримує культурно адаптовану педагогіку, засновану на іграх, що відповідає принципам пост-методології як способу трансформації взаємозв'язків між читанням та письмом у контекстах обмежених ресурсів.

Ключові слова: взаємозв'язок між читанням та письмом, навчання на основі ігор, експеримент з формування грамотності, рання грамотність, письмо та навички письма.

INTRODUCTION

Reading and writing are fundamentally interconnected literacy skills. They draw upon a common pool of cognitive and linguistic resources. Reading and writing form a bidirectional relationship in which each skill supports the development of the other (Kim et al., 2018; Kim & Zagata, 2024). Historically, reading and writing skills were often treated as separate domains in literacy instruction. The current research suggests that reading and writing are built upon largely shared systems, including working memory, attention, and foundational oral language skills such as vocabulary and grammatical knowledge (Kim & Zagata, 2024). The Interactive Dynamic Literacy Model further explains that reading and writing co-develop and influence one another over time.

Empirical evidence shows that the reading–writing relationship operates at both lexical and discourse levels (Graham & Hebert, 2010; Shanahan, 2016). It is strongest at the lexical level, such as word reading and spelling, but also extends to discourse, where reading comprehension and written composition predict each other longitudinally (Fitzgerald & Shanahan, 2000; Graham et al., 2017). Writing enhances comprehension by requiring learners to synthesise and articulate ideas, while reading exposure helps internalise sentence structures and organisational patterns (Krashen, 2004; Nagy & Anderson, 1984). These findings support integrated instruction rather than separating reading and writing development (Graham & Hebert, 2010).

The reading–writing relationship is dynamic, influenced by instructional approaches, learners' language proficiency, and the literacy environment (Graham et al., 2017; Kim & Zagata, 2024). Integrated instruction enhances this reciprocity, enabling learners to transfer knowledge between reading and writing more effectively than isolated teaching (Kim & Graham, 2022; Graham et al., 2017). In addition, pupils with stronger oral language, richer vocabulary, and better grammatical knowledge perform reading and writing tasks more effectively (Kim & Graham, 2022). Likewise, print-rich and meaningful literacy environments provide repeated opportunities to engage with and produce texts, further reinforcing the interaction between the skills (Graham et al., 2017; Kim & Zagata, 2024). Together, these factors shape the strength of the reading–writing connection, which must be considered to support the integrated development of both skills.

In many English as a Foreign Language (EFL) context, particularly rural sub-Saharan Africa, these conditions are constrained. Learners often have limited exposure to English outside the classroom, restricting opportunities to practise reading and writing (Brock-Utne, 2015; Kim & Graham, 2022). Shortages of textbooks further limit access to reading materials, reducing opportunities to internalise vocabulary and discourse patterns (Graham & Hebert, 2010). Large class sizes and heavy workloads also restrict individualised feedback, weakening the link between reading and writing development (Graham et al., 2017). As a result, the interaction between these skills may remain underdeveloped.

Despite growing recognition of the reciprocal relationship between reading and writing, this relationship remains underdeveloped in many rural EFL contexts, including Tanzanian primary schools, due to limited exposure to English, scarcity of instructional materials, and reliance on traditional teaching approaches. Moreover, while game-based learning has shown promise in literacy development, existing research has largely focused on digital games in well-resourced settings, leaving the potential of culturally grounded local games insufficiently explored. As a result, there is limited empirical understanding of how context-sensitive, game-based pedagogies can strengthen the reading–writing relationship in resource-constrained environments.

These realities call for a fundamental shift in instructional approach. According to the post methodism perspectives, the current language teaching era which recognises that no single method can satisfy all diverse learning context, shifts the focus of teaching from “knowledge-oriented” theories to “classroom -oriented” pedagogical practices (Lusianov, 2020). Post methodism advocates for the development of context-sensitive pedagogies that emerge from and respond to the specific challenges and resources of the local environment (Kumaravadivelu, 2002). These contextual constraints highlight the need for innovative, culturally appropriate instructional approaches that simultaneously foster reading and writing skills in resource-limited EFL settings (Kim & Zagata, 2024). One promising avenue is the use of local games in literacy instruction.

Culturally grounded methods enhance learning by connecting to learners’ prior knowledge and reducing language anxiety (Ladson-Billings, 2021). Game-based learning provides a low-stakes environment for practising language through repetition, feedback, and motivation (Reinhardt, 2019). Moreover, when based on local traditions, such games become more relevant and engaging.

Local games offer a meaningful way to strengthen the reading–writing relationship in resource-limited EFL contexts. When combined with literacy tasks, they engage learners in both reading and writing, reinforcing their interaction (Graham & Hebert, 2010; Kim & Graham, 2022). Through structured play, learners develop foundational skills such as letter recognition, vocabulary, and sentence formation while remaining motivated (Krashen, 2004; Vygotsky & Cole, 1978). This aligns with the post-method principle of practicality, which views teachers as creators of context-sensitive pedagogy (Kumaravadivelu, 2006).

However, empirical evidence on game-based literacy instruction remains limited, especially in low-resource contexts. Most studies focus on digital games in well-resourced settings (Plass et al., 2015), with little attention to local games. Few studies also examine how such approaches influence the relationship between reading and writing subskills (Kim & Graham, 2022; Graham et al., 2017). This gap is particularly evident in rural EFL settings with limited English exposure and resources (Kim & Zagata, 2024). Addressing this gap is essential for developing contextually relevant pedagogy (Kumaravadivelu, 2012).

The present study addresses these gaps by examining how local game-based English instruction affects the development of, and relationship between, reading and writing subskills among Tanzanian rural primary school pupils. Reading subskills assessed included letter-sound knowledge, basic word reading, oral text reading accuracy, and reading comprehension; whereas writing subskills included letter writing accuracy, word writing accuracy, and text writing accuracy.

By investigating these interconnected skills, the study aims to elucidate how culturally grounded, game-based pedagogies can reshape the reading–writing relationship in resource-limited EFL contexts like Tanzania. In doing so, the study responds to the post method call for pedagogical innovation that emerges from and is tailored to the specific conditions of the local context, rather than relying on methods developed elsewhere (Kumaravadivelu, 2006). Two research questions guided this study:

1. What is the relationship between reading and writing subskills before and after the intervention?
2. To what extent do post reading subskills predict post-test writing performance, and in what way does local games-based instruction influence this relationship?

This study contributes to literacy research in underrepresented contexts. It provides empirical evidence from rural Tanzanian classrooms, examines literacy at the subskill level, and uses a quasi-experimental design with correlational analysis to explore both performance and relationships among skills. The findings offer insights for developing effective, context-sensitive literacy instruction in similar settings.

THEORETICAL FRAMEWORK

This study employed the theories of interactive-Compensatory Model (ICM) (Berninger et al., 2002), Socio-Cultural Theory (SCT) (Vygotsky, 1978), and Post-Method Pedagogy (PMP) (Kumaravadivelu, 2002; Kumaravadivelu, 2006). ICM explains that reading and writing share cognitive, linguistic resources and interact dynamically, with strengths be one one skill compensating the weaknesses of the other skill. On the other hand, SCT emphasises that learning occurs through social interaction and culturally meaningful activities. It positions local games as mediational tools that support collaborative and contextually relevant literacy development.

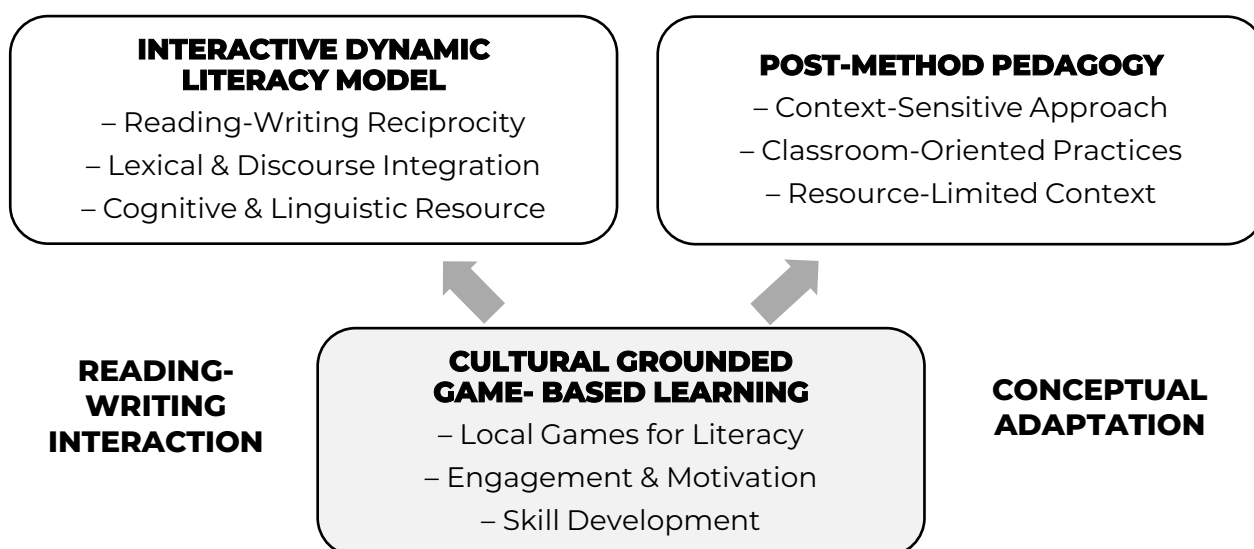
Furthermore, PMP which complements these perspectives by advocating for context-sensitive, practice-oriented instruction, and enabling teachers to integrate local games as culturally appropriate strategies in under-resourced classrooms. Together, these theories explain how game-based, socially grounded, and context-responsive instruction can enhance pupils' reading and writing development.

CONCEPTUAL FRAMEWORK

Building on these theories, conceptual framework links local games-based English instruction (independent variable) with literacy outcomes through mediating factors such as learner engagement, motivation, and peer interaction. The dependent variables include reading sub-skills (letter recognition, word decoding, reading comprehension) and writing skills (letter, word, and text writing accuracy). The framework (see Figure 1) illustrates how culturally grounded, interactive learning enhances engagement, thereby improving literacy outcomes and reshaping reading-writing relationships.

Figure 1

Conceptual framework linking theoretical models to cultural game-based literacy instruction



METHODOLOGY

The Design and Approach

This study was part of a broader design-based research (DBR) project conducted to explore local games played by pupils, identify local games potential for enhancing learning of literacy skills, and evaluation of the impact of local games intervention in literacy learning. However, this particular study focused only on part of the project, intervention phase. A quasi-experimental pre-test/post-test design with embedded correlational analyses (Mallette & Duke, 2020) involving two experimental groups and one control group were involved in the study.

This research design addressed two aims with their corresponding research questions: (1) to examine how reading and writing subskills relate before and after the intervention? and (2) to determine to what extent does the post-test reading subskills predict post-test writing performance, and how does the local games-based instruction influence this relationship? Combining experimental manipulation with correlational analysis allowed researchers to understand not only the occurred changes but also the mechanisms underlying these changes (Stanovich & Cunningham, 2004). The quasi-experimental component establishes the intervention's effects, while the correlational component reveals whether the pattern of relationships among literacy subskills was fundamentally altered.

Participants

Many primary school pupils in Tanzania face difficulties in developing their English reading and writing abilities (Barrett et al., 2024). These issues are more severe in rural regions where educational resources are scarce. Owing to logistical and financial limitations, the current research was carried out in Chamwino District, in Dodoma Region. Carrying this study only to this area allowed for careful observation of the intervention and promoted ongoing involvement with the schools involved in the study. Chamwino District was intentionally chosen due to evidence highlighting ongoing literacy difficulties faced by pupils in rural schools (Ndijuye & Beatus, 2022).

Additionally, an initial literacy assessment carried out before the intervention fostered the selection of this area for the study. The assessment revealed a significant difficulty in English reading and writing among Standard Three pupils in the district.

The research focused on rural areas to represent the actual experiences of learning in remote educational settings. Three primary public primary schools, situated in different wards, were intentionally chosen due to their comparatively low results in the preliminary literacy assessment. The original sampling frame included 2,201 registered Standard Three pupils from the chosen schools.

The sample size for this study was computed using Cochran's formula (Cochran, 1977),
$$\frac{Z_{1-\alpha/2}^2 P(1-P)}{d^2}$$
, with parameters established at $Z = 1.96$ (which corresponds to a 95% confidence level), $p = 0.5$, and $d = 0.05$, resulting in a minimum sample size of 385 pupils. Nonetheless, because of practical limitations and the involvement of intact classes, the ultimate sample included 328 pupils from six participating schools, with one Standard Three class chosen from each institution. The preliminary assessment involved all 328 pupils.

After this stage, a sub-sample was selected for the intervention phase. Selection was carried out intentionally at the class level to maintain authentic classroom environments and reduce interruptions to normal school timetable. Three intact classes ($N = 176$ pupils) were selected for the study based on literacy performance made in the initial

assessment. The classes were categorised as school A (n = 59 pupils) and school B (n = 43 pupils) forming experimental groups, whereas school C (n = 74 pupils) acted as the control group. The intervention was conducted at the class level to minimize the possibility of contamination among groups. In addition, all subsequent analyses for this study were derived from this intervention sample (N = 176).

Intervention

The intervention programme took 20 weeks, providing pupils with two hours of teaching each week. Pupils in the experimental groups participated in organized English literacy tasks integrated into locally familiar cultural games. This study opted for this time frame to guarantee adequate exposure for significant literacy growth, as the prolonged, moderately timed interventions are more successful for fundamental skill learning than short or disjointed methods (Castles et al., 2018).

Two experimental schools (named as A and B) were involved in using local games embedded with English activities. However, one school named C, was the control school which maintained normal English instruction stipulated in the national curriculum. The intervention targeted two local games – *rede* and *ruka kamba* – chosen based on their familiarity among pupils, frequency of usage, and enjoyment levels. Both games were systematically modified to include organised English literacy tasks while maintaining their initial gameplay dynamics.

Rede is one of the cultural games typically played by two players who stand at opposite points, while the other players play within the space between them. External players play by throwing a ball towards players situated inside, while the inside players try to escape or catch the ball. When the inside players catch the ball, they throw it far away and begin filling a bottle with sand to symbolise victory, repeating the process upon the agreed number. In this study, the game structure was embedded with English language tasks. This replaced the traditional end activity of filling a bottle with sand and ensured that gameplay was systematically linked to literacy learning objectives.

Similarly, *ruka kamba* (rope skipping), involves two players who stand at opposite points swinging a rope. Other players play by jumping within the moving rope. Players who do not keep the rhythm and get hit by the rope are usually omitted from the playing round. In this research, the elimination of players who get touched by the rope was redefined as a chance to learn English literacy. Pupils hit by the rope had to perform particular English language tasks. Those who performed the English tasks successfully got chance to returning into playing, while those who failed were eliminated. This adaptation allowed continuous participation while reinforcing targeted literacy skills.

During intervention, when players of *rede* catch and throw the ball far away, and players of *ruka kamba* who truck by the rope when playing the game, were required to complete the structured English literacy activities. The performed English literacy activities at the letter level focused on identifying, pronouncing, sequencing, matching letters with images, and writing target letters. The word-level activities comprised constructing simple words from letter planks, reading words aloud, spelling words, using words in sentences, and matching words with pictures.

To help them write sentences they were required to perform activities such as copying sentences and reading on their own or in pairs or group. They were also required to do activities like matching sentences with pictures, answering questions, finding the idea and arranging pictures in order to tell a story. These activities were for enhancing the reading comprehension. All these activities were performed by pupils while playing

games. So, it was fun and interactive. The games and the English activities went together to help the learners get better at reading and writing.

This approach ensured that participation in games was consistently linked to literacy development. The activities intended to be developed were seven core skills: letter sounds, basic word reading, text oral reading accuracy, reading comprehension, and writing accuracy. Integrating literacy tasks into familiar games enhanced engagement while strengthening both foundational and advanced literacy skills.

Data Analysis

This study intended to find out what happens when pupils engage with literacy development using local games. It looked how well pupils can develop their reading and writing skills through a comprehensive quantitative analysis made using STATA. To understand how changes in the intervention happened, the study descriptively computed the means and standard deviations to both reading and writing subskill in pre-test and post-test. This provided an essential overview of developmental shifts following the intervention. Moving beyond simple gains, the study then explored how the reading and writing subskills related to one another before and after instruction. The Pearson product-moment correlation coefficients were calculated at both time points to capture the strength and direction of these relationships.

The study also performed the multiple regression analyses to uncover how reading subskills predicted the writing performance. The separate multiple regression analyses were conducted for pre-test and post-test data, with reading subskills entered simultaneously as predictors of writing outcomes. By examining changes in the variance explained (R^2) and the shifting patterns of standardized regression coefficients (β), the analysis illuminated a critical transformation that the local games-based instruction did not merely improve literacy skills but it fundamentally restructured the predictive relationships between reading and writing, revealing new pathways for how these competencies developed in tandem.

RESULTS

Descriptive Statistics

Descriptive statistics provide an overview of pupils' literacy performance before and after the intervention (Table 1). Pre-test scores were very low across all subskills, ranging from 0.29 (text writing accuracy) to 20.88 (letter sound), indicating limited literacy. After the local games-based instruction, all subskills improved, with post-test means ranging from 19.36 (reading comprehension) to 65.20 (letter sound), showing moderate variability. These results suggest the intervention effectively enhanced both foundational and higher-order literacy skills, especially in text oral reading and writing.

Table 1

Mean and Standard Deviation of Pre-Test and Post-Test Scores Across Literacy Subskills

Literacy Subskill	Pre-Test Mean (SD)	Post-Test Mean (SD)
Letter sound	20.88 (24.54)	65.20 (26.65)
Read basic word	14.31 (22.49)	47.35 (29.28)
Text oral reading accuracy	2.65 (9.54)	27.45 (26.16)
Reading comprehension	1.47 (4.31)	19.36 (21.17)
Letter writing accuracy	7.45 (15.71)	62.55 (31.36)
Word writing accuracy	1.37 (5.64)	31.18 (29.39)
Text writing accuracy	0.29 (2.21)	20.78 (21.97)

The Relationship Between Reading and Writing Subskills *Before* and *After* the Intervention

The first research question examined the relationships between literacy components (reading and writing) before and after the intervention in both control and experimental groups. Pearson correlation coefficients (Tables 2 and 3) show that foundational reading skills were linked to lower-level writing skills in the control group, while text writing developed largely independently. In the experimental groups, correlations between reading and writing subskills were positive and strengthened after the intervention.

Specifically, for the control group (Table 2), pre-test correlations among reading and writing subskills were moderate. Letter sounds were moderately associated with basic word reading ($r = 0.492$), text oral reading accuracy ($r = 0.362$), reading comprehension ($r = 0.282$), and writing skills ($r = 0.287$ – 0.348). Basic word reading was strongly linked to text oral reading accuracy ($r = 0.594$), reading comprehension ($r = 0.465$), and letter writing accuracy ($r = 0.492$).

Letter writing was strongly correlated with word writing ($r = 0.537$), while text writing accuracy showed weak or non-significant associations. At post-test, lower-level skills remained moderately correlated, but higher-level skills like text writing developed more independently, indicating that complex writing does not automatically improve without targeted instruction.

Table 2

Pre-test and Post-test Correlations among Reading and Writing Skills in the Control Group

Variables	1	2	3	4	5	6	7
1. Letter Sounds	1						
2. Read Basic Words	0.492 (0.303)	1					
3. Text Oral Reading Accuracy	0.362 (0.358)	0.594 (0.407)	1				
4. Reading Comprehension	0.282 (0.345)	0.465 (0.344)	0.242 (0.449)	1			
5. Letter Writing Accuracy	0.287 (0.144)	0.492 (0.254)	0.301 (0.352)	0.264 (0.258)	1		
6. Word Writing Accuracy	0.348 (0.236)	0.370 (0.331)	0.332 (0.274)	0.034 (0.318)	0.537 (0.244)	1	
7. Text Writing Accuracy	0.003 (-0.057)	0.050 (-0.004)	-0.114 (0.147)	-0.022 (-0.103)	0.354 (-0.074)	0.382 (0.124)	1

Note. Values outside parentheses represent pre-test correlations; values in parentheses represent post-test correlations.

Pearson correlation coefficients were computed to examine relationships among seven literacy subskills in the experimental groups before and after the intervention. At pre-test (Table 2), all measures were significantly correlated except for associations involving text writing accuracy. The strongest correlations were between letter writing accuracy and basic word reading ($r = 0.723$) and between basic word reading and letter sounds ($r = 0.684$). Text oral reading accuracy was also strongly correlated with letter writing accuracy ($r = 0.680$) and basic word reading ($r = 0.643$). In contrast, text writing accuracy showed weak correlations with most other measures, particularly with text oral reading accuracy ($r = 0.104$) and letter writing accuracy ($r = 0.108$), indicating that text-level writing skills were relatively distinct from foundational literacy skills at the outset.

At post-test (Table 3; Figure 2), the correlation pattern shifted. The relationship between basic word reading and letter sounds strengthened ($r = 0.744$), while several previously strong correlations weakened. For instance, the correlation between letter writing accuracy and basic word reading decreased to $r = 0.357$, and the correlation between text oral reading accuracy and word writing accuracy dropped from $r = 0.632$ to $r = 0.149$. Conversely, correlations within the writing domain strengthened, particularly between word writing and text writing accuracy, which increased from $r = 0.445$ to $r = 0.646$.

The comparison of pre- and post-test correlations shows a general dissociation between reading and writing measures, alongside stronger correlations within the writing domain. The reduced cross-domain correlations, particularly between reading and writing accuracy, likely reflect the development of more specialized or automated sub-skills, while the strengthened association between word- and text-level writing indicates greater integration of these skills as pupils progressed.

Table 3

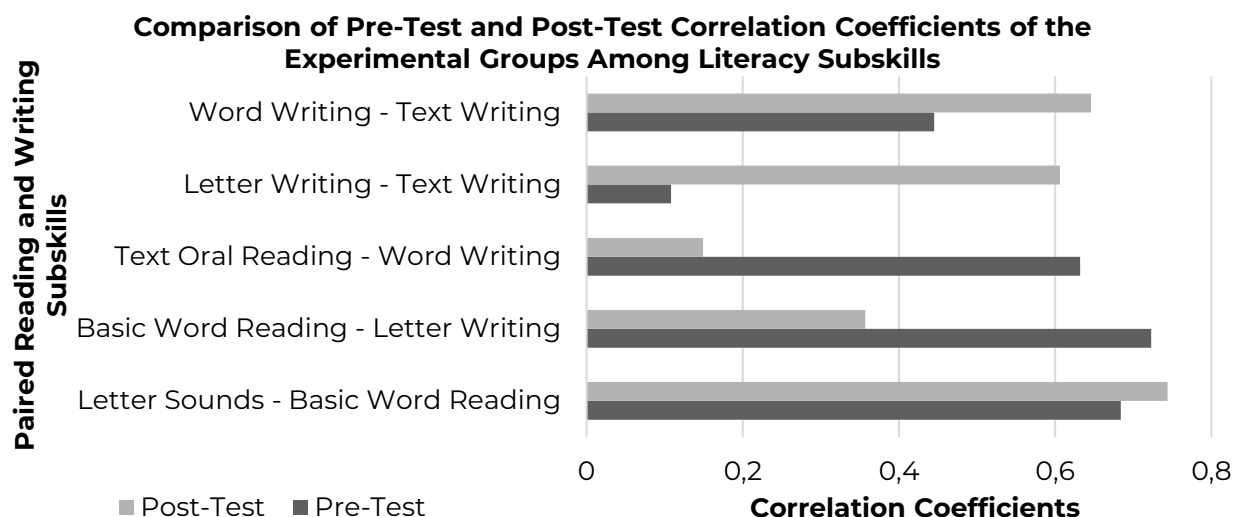
Pre-test and Post-test Correlations among Reading and Writing Skills in the Experimental Groups

Variables	1	2	3	4	5	6	7
1. Letter Sounds	1						
2. Basic Word Reading	0.684 (0.744)	1					
3. Text Oral Reading Accuracy	0.519 (0.604)	0.643 (0.679)	1				
4. Reading Comprehension	0.455 (0.480)	0.424 (0.556)	0.602 (0.528)	1			
5. Letter Writing Accuracy	0.476 (0.280)	0.723 (0.357)	0.680 (0.385)	0.538 (0.384)	1		
6. Word Writing Accuracy	0.471 (0.261)	0.429 (0.281)	0.632 (0.149)	0.609 (0.304)	0.621 (0.593)	1	
7. Text Writing Accuracy	0.325 (0.204)	0.353 (0.289)	0.104 (0.305)	0.266 (0.432)	0.108 (0.606)	0.445 (0.646)	1

Note. Values outside parentheses represent pre-test correlations, while values in parentheses represent post-test correlations.

Figure 2

Comparing the pre- and post-test correlation coefficients of intervention groups



Multiple linear regression analysis (Table 4) examined the influence of reading tasks – letter sounds, word reading accuracy, text oral reading accuracy, and reading comprehension – on pupils' writing scores before and after the local games' intervention. At pre-test, writing performance was significantly predicted by several reading subskills, particularly reading comprehension and text oral reading accuracy. Letter writing accuracy was predicted by read basic words ($B = 0.390$, 95% CI [0.257, 0.522], $p < 0.001$), text oral reading accuracy ($B = 0.448$, 95% CI [0.148, 0.747], $p = 0.004$), and reading comprehension ($B = 0.731$, 95% CI [0.158, 1.304], $p = 0.013$), while letter sounds were not significant ($B = -0.088$, 95% CI [-0.199, 0.023], $p = 0.118$).

Pre-word writing was predicted by text oral reading accuracy ($B = 0.237$, 95% CI [0.111, 0.363], $p < 0.001$) and reading comprehension ($B = 0.423$, 95% CI [0.183, 0.663], $p = 0.001$), whereas letter sounds and basic word reading were not. Pre-text writing was influenced by reading basics ($B = 0.039$, 95% CI [0.012, 0.066], $p = 0.006$), text oral reading accuracy ($B = -0.088$, 95% CI [-0.149, -0.026], $p = 0.006$), and reading comprehension ($B = 0.137$, 95% CI [0.020, 0.255], $p = 0.022$), while letter sounds remained non-significant ($B = 0.012$, 95% CI [-0.011, 0.034], $p = 0.316$). These results indicate that pre-test writing relied on multiple reading subskills, with comprehension and oral reading accuracy being particularly influential.

At post-test, reading comprehension became the sole consistent predictor across all writing outcomes. Letter writing was predicted only by reading comprehension ($B = 0.338$, 95% CI [0.005, 0.670], $p = 0.047$), with no significant contributions from letter sounds, basic word reading, or text oral reading accuracy. Similarly, word writing was predicted only by reading comprehension ($B = 0.330$, 95% CI [0.005, 0.655], $p = 0.047$), and text writing remained predicted solely by reading comprehension ($B = 0.392$, 95% CI [0.160, 0.625], $p = 0.001$).

Comparing pre- and post-test results reveals a clear shift: writing initially relied on multiple reading subskills, but following the intervention, reading comprehension emerged as the primary driver of writing improvement. This pattern highlights the central role of comprehension in supporting literacy development and suggests that local games-based instruction strengthened pupils' comprehension skills, enabling more autonomous writing

Table 4

Post-Test Reading Predictors of Writing Performance Following Local Games intervention

Writing Outcome	Predictor	Coefficient (β)	Std. Error (SE)	t	p-value	95% CI (Lower – Upper)
Pre-letter writing	Letter sounds	-0.088	0.056	-1.58	0.118	-0.199 – 0.023
	Read basic words	0.39	0.067	5.84	0	0.257 – 0.522
	Text oral reading accuracy	0.448	0.151	2.96	0.004	0.148 – 0.747
	Reading comprehension	0.731	0.289	2.53	0.013	0.158 – 1.304
Pre-word writing	Letter sounds	0.04	0.023	1.69	0.094	-0.007 – 0.086
	Read basic words	-0.021	0.028	-0.75	0.453	-0.077 – 0.034

Writing Outcome	Predictor	Coefficient (β)	Std. Error (SE)	t	p-value	95% CI (Lower – Upper)
	Text oral reading accuracy	0.237	0.063	3.75	0	0.111 – 0.363
	Reading comprehension	0.423	0.121	3.5	0.001	0.183 – 0.663
Pre-text writing	Letter sounds	0.012	0.011	1.01	0.316	-0.011 – 0.034
	Read basic words	0.039	0.014	2.84	0.006	0.012 – 0.066
	Text oral reading accuracy	-0.088	0.031	-2.83	0.006	-0.149 – -0.026
	Reading comprehension	0.137	0.059	2.32	0.022	0.020 – 0.255
Post-letter writing	Letter sounds	-0.055	0.164	-0.34	0.736	-0.380 – 0.270
	Read basic words	0.132	0.166	0.8	0.428	-0.197 – 0.461
	Text oral reading accuracy	0.251	0.156	1.61	0.111	-0.058 – 0.559
	Reading comprehension	0.338	0.168	2.01	0.047	0.005 – 0.670
Post-word writing	Letter sounds	0.131	0.16	0.82	0.415	-0.187 – 0.449
	Read basic words	0.173	0.162	1.07	0.289	-0.149 – 0.494
	Text oral reading accuracy	-0.185	0.152	-1.21	0.227	-0.487 – 0.117
	Reading comprehension	0.33	0.164	2.01	0.047	0.005 – 0.655
Post-text writing	Letter sounds	-0.086	0.115	-0.75	0.457	-0.313 – 0.142
	Read basic words	0.057	0.116	0.49	0.626	-0.173 – 0.287
	Text oral reading accuracy	0.098	0.109	0.9	0.371	-0.118 – 0.314
	Reading comprehension	0.392	0.117	3.34	0.001	0.160 – 0.625

The Change of Predictive Role of Reading Subskills on Writing Performance After Intervention

This study examined how the predictive power of reading subskills on writing outcomes shifted after a local games-based intervention (see Table 4 and Figure 3). For letter writing, reading subskills accounted for 63.1% of the variance at pre-test ($R^2 = 0.631$) but only 19.9% at post-test ($R^2 = 0.199$; $\Delta R^2 = -0.432$). For word writing, variance explained decreased from 47.5% to 12.7% ($\Delta R^2 = -0.348$). Text writing showed minimal change, with variance explained declining slightly from 21.4% to 19.9% ($\Delta R^2 = -0.015$). These findings indicate that the intervention substantially reduced reliance on reading skills for basic writing tasks while text writing continued to draw on higher-level reading proficiency,

suggesting that the approach fosters autonomy in foundational writing and supports sustained integration at more complex levels.

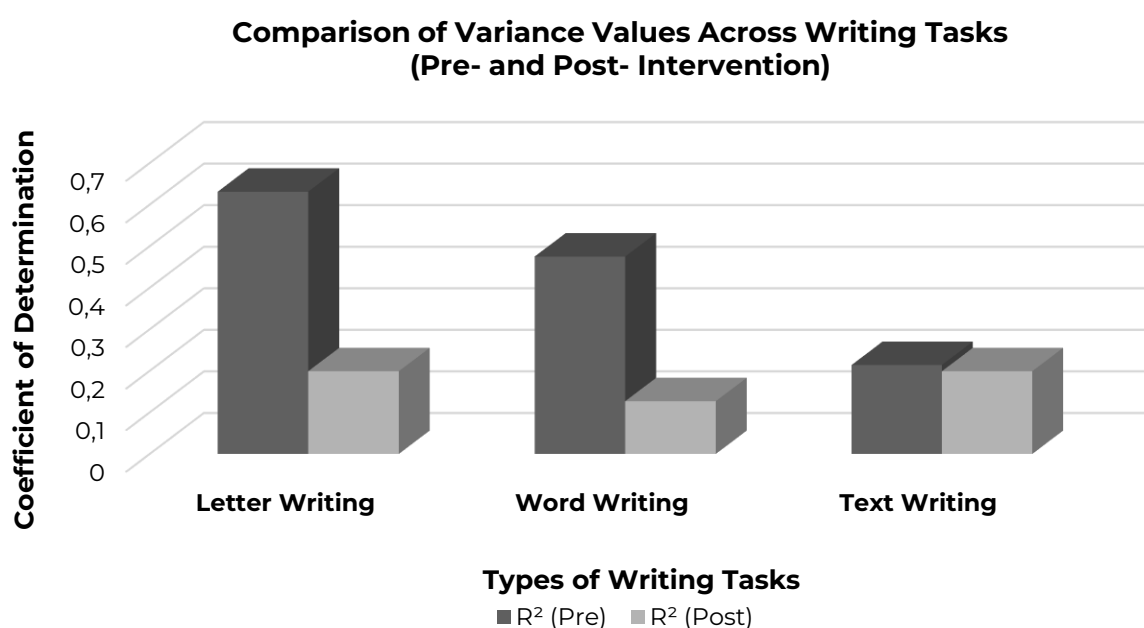
Table 4

Comparison of Pre and Post Tests' Change in Variances

Model	R ² (Pre)	R ² (Post)	Change in Variance (ΔR^2)
Letter Writing	0.631	0.199	-0.432
Word Writing	0.475	0.127	-0.348
Text Writing	0.214	0.199	-0.015

Figure 3

Comparisons of variance values to indicate the change of predictive role of reading subskills on writing performance



DISCUSSION

This study examined the relationship between reading and writing components before and after a local games-based intervention, and the extent to which post-intervention reading subskills predicted writing performance. The findings revealed that prior to the intervention, experimental groups showed strong and significant correlations across most reading and writing measures, except for text writing accuracy, which was weakly associated with other skills. The study was specifically found the existence of the strong correlations between letter writing accuracy and basic word reading ($r = 0.723$), and between basic word reading and letter sounds ($r = 0.684$).

These patterns suggest that early literacy skills share a common underlying knowledge base that include phonological and orthographic awareness (Fitzgerald & Shanahan, 2000). These findings are consistent with Interactive-Compensatory Model (ICM). The close relationship between letter-level writing and word-level reading indicates these foundational skills develop in tandem, reflecting linguistic interdependence (Cummins, 1979). However, text writing accuracy demonstrated weak correlations with other measures, suggesting that higher-level writing skills were not yet fully integrated with

lower-level transcription processes, as also explained by ICM, where higher-order processes develop more gradually.

Following the intervention, a clear shift in relationships was observed. Reading and writing became more differentiated, while relationships within the writing domain strengthened. For example, the correlation between word writing and text writing increased substantially ($r = 0.445$ to $r = 0.646$), suggesting improved integration of writing processes through automatisisation (Berninger et al., 2002).

In contrast, cross-domain correlations weakened, indicating an increase of specialisation (Perfetti, 2007), which aligns with ICM in explaining how skills become more autonomous over time. From a pedagogical perspective, a shift reflects a Socio-Cultural Theory (SCT), as local games provided meaningful, socially mediated learning contexts that supported internalisation of writing skills (Vygotsky, 1978). Furthermore, the findings also reflect on Post-Method Pedagogy (PMP), which emphasises on context-sensitive strategies that enhance engagement (Kumaravadivelu, 2002).

Furthermore, the regression analyses highlighted this transformation. At pre-test, multiple reading subskills significantly predicted writing performance, but after the intervention, reading comprehension emerged as the only consistent predictor, with reduced variance explained. This suggests that an increase of autonomy in writing, particularly at the transcription level, is consistent with automatisisation theories (Logan, 1988) and the compensatory mechanisms described in ICM. At the same time, the effectiveness of repeated, meaningful practice reflects SCT, where learning is reinforced through interaction, and PMP, where teachers adapt instruction to local contexts (Kumaravadivelu, 2006).

In the case of text writing, it showed minimal change with reading comprehension remaining a strong predictor, consistent with discourse-level models (Shanahan, 2006) and the higher-order integration explained by ICM. Overall, the findings demonstrate that local games-based instruction promotes both differentiation and integration in literacy development. This outcome is best understood through the combined lens of ICM, SCT, and PMP, which together explain how cognitively shared processes, socially mediated learning (Kwambaza, 2024), and context-responsive pedagogy interact (Omollo et al., 2024) to enhance pupils' literacy development.

CONCLUSIONS

This study demonstrates that a local games-based literacy intervention transformed the relationship between reading and writing skills among pupils with low baseline literacy levels. The findings indicate a shift from reliance on multiple reading subskills to a pattern in which reading comprehension became the main predictor of writing performance, alongside reduced cross-domain interdependence. The decline in variance explained by reading subskills in foundational writing tasks suggests increased autonomy in writing development. From a post-method perspective, this reflects the value of context-sensitive pedagogy, where instruction grounded in learners' cultural resources and developmental needs can reshape relationships between literacy skills (Kumaravadivelu, 2006).

These findings highlight the potential of culturally responsive, game-based approaches to support integrated yet differentiated literacy development in resource-limited contexts. The study supports the post-method view that effective pedagogy emerges from aligning instructional practices with learners' contextual realities rather than applying universal methods (Kumaravadivelu, 2002), and it contributes evidence for the effectiveness of locally grounded, play-based approaches to literacy instruction.

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CONFLICT OF INTEREST

The authors declare that there is no conflict of interest regarding the publication of this paper.

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ARTIFICIAL INTELLIGENCE STATEMENT

No artificial intelligence tools were used in the preparation of this manuscript.

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MENTORING THROUGH ONE'S OWN INQUIRY: EXPLORATORY ACTION RESEARCH OF PRE-SERVICE ENGLISH TEACHERS' HOME READING

МЕНТОРСТВО ЧЕРЕЗ ВЛАСНЕ ПРАКТИЧНЕ ДОСЛІДЖЕННЯ ОРГАНІЗАЦІЇ
ДОМАШНЬОГО ЧИТАННЯ МАЙБУТНІХ УЧИТЕЛІВ АНГЛІЙСЬКОЇ МОВИ

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ABSTRACT

Purpose. Exploratory action research (EAR) is crucial for equipping pre-service teachers with the knowledge and skills they need for continuous professional development. The aim of this article is to outline how university teachers can develop their own EAR skills to become reflective practitioners and, in turn, mentor their mentees (pre-service teacher trainees and in-service schoolteachers) in conducting educational research. We believe that gaining field experience should include solving practice problems through exploration, intervention, and reflective analysis.

Methodology. The methodology combines a critical reading of the action-research literature, reflection on our own teaching, and empirical study of our daily work as educators (lesson observation, surveys, and quantitative and qualitative essay analysis). The topic concerned the reluctance of a number of pre-service English teachers to engage in reading for pleasure. At H.S. Skovoroda Kharkiv National Pedagogical University, 88 Year 2–3 trainees consented to a questionnaire; 46 Year 2 students of that group also wrote a short essay; and one teaching group of 15 (drawn from the 46) was observed and took part in the intervention.

Results. The project reshaped our understanding of how to support pleasure-based reading. Teachers should prioritise texts that match individual interests rather than one-size-fits-all assignments; help students build confidence by offering graded options and scaffolded support; and create space for students to choose modern genres. It is vital to develop academic reading skills separately from reading-for-pleasure routines so that students do not associate English solely with stress.

Conclusions. The EAR cycle helped us, as teacher educators, better understand the benefits of action research and the challenges our students face at each phase of it. The experience will be invaluable for mentoring and scaffolding their research during teaching practice.

Keywords: exploratory action research, reading for pleasure, intervention, scaffolding.

Мета. Дослідницько-практичне дослідження (EAR) має вирішальне значення для забезпечення майбутніх учителів знаннями та навичками, необхідними для безперервного професійного розвитку. Мета статті – окреслити, як викладачі університетів можуть розвивати власні дослідницькі навички, щоб стати рефлексивними практиками та, як наслідок, підвищити свою здатність наставляти своїх підопічних (студентів та шкільних учителів) у проведенні освітніх досліджень. Автори вважають, що отримання досвіду під час практики в школах має включати вирішення практичних проблем шляхом дослідження, втручання та рефлексивного аналізу.

Методологія. Методологія дослідження поєднує критичний аналіз літератури з освітніх досліджень, рефлексію щодо нашого викладання та емпіричні методи дослідження нашої повсякденної діяльності як викладачів (спостереження за заняттями, опитування учасників та якісний і кількісний аналіз есе). Тема дослідження стосувалася небажання низки майбутніх учителів англійської мови займатися читанням для задоволення. У Харківському національному педагогічному університеті імені Г.С. Сковороди 88 студентів 2–3 курсів дали згоду відповісти на анкету; 46 з них (студенти 2 курсу) написали також коротке есе; одна група з 15 студентів (з тих 46) була залучена до спостереження за заняттями та інтервенцією.

Результати. Проєкт змінив наше розуміння того, як підтримувати читання для задоволення. Викладачі повинні надавати пріоритет текстам, що відповідають індивідуальним інтересам, а не універсальним завданням; допомагати студентам розвивати впевненість, пропонуючи різноманітні варіанти та ґрунтовну підтримку; створювати простір для вибору студентами жанрів сучасної художньої літератури. Вкрай важливо розвивати академічні навички читання окремо від читання для задоволення, щоб не закріплювати асоціацію англійської мови зі стресом.

Висновки. Цикл EAR допоміг нам, як тим, хто навчає майбутніх учителів, краще зрозуміти переваги освітнього дослідження та труднощі, з якими стикаються наші студенти на всіх його етапах. Цей досвід буде безцінним для наставництва та підтримки досліджень наших студентів під час їхньої педагогічної практики.

Ключові слова: дослідницько-практичне дослідження, читання для задоволення, інтервенція, педагогічна підтримка.

INTRODUCTION

Exploratory action research (EAR) has been considered one of the most important aspects of any teacher's professional life, both in everyday practice and in continuous professional development. Determined not to stagnate, modern teachers face many challenges in keeping up with a rapidly changing educational context: the setting, learners' traits, digitalisation, educational reforms, and Ministry requirements. Multitasking has become a relentless and, when it works, rewarding feature of a teacher who wishes not just to survive in wartime Ukraine but to facilitate their students' development and help them become full-fledged citizens of their country, despite forced relocation and tragic events around them. Cases of burnout under prolonged stress have been reported across the educational community, affecting both teachers and students. We firmly believe that engagement in research helps people cope with stressful situations: it lets them solve real problems and feel successful. But this can happen only if teachers and students are equipped with the theoretical knowledge and practical skills needed for exploration, reflection, and intervention. That equipping is a task for university teachers.

Ukrainian universities have been increasing the number of credits allocated to teaching practice, paying closer attention to students' practical training. However, any mechanical increase will not produce a qualitative change in pre-service teachers' skills unless that practice is accompanied by action research, the development of an inquiry stance, and a deeper understanding of the rationale behind the educational process. As Wipperfurth and Mehlmauer-Larcher put it, student-teachers 'mediate' between theories from different academic disciplines and the concrete 'field of practice,' so that theory and practice are no longer viewed as 'two opposing fields' (Wipperfurth & Mehlmauer-Larcher, 2022).

Scholars argue that university teachers, as experts, can show the pathway to professional development (Smit et al., 2024) and introduce action research as an effective tool for the sustainable development of both individual teachers and the professional community (Wipperfurth & Mehlmauer-Larcher, 2022). Yet not every university teacher has been engaged in EAR. Even those with a PhD in Education do not always distinguish academic research from exploratory action research, and cannot help students define 'a realistic and acceptable scope for pre-service teacher research efforts' (Darwin & Barahona, 2021, p. 11). When university teachers carry out EAR of their own, however, they become better aware of the challenges their mentees face and better placed to address them.

Our suggestions are based on the experience gained by teaching the university methodology course and organizing teacher refresher courses, by supervising pre-service teachers doing their Bachelor's research papers and Master's qualification works, by participating in the joint projects of the Ministry of Education and Science of Ukraine and the British Council (New Generation Schoolteacher, 2013–2019), and the project of PAELT and the University of Warwick (Mentoring for EAR, 2025–2026).

The issue of teacher trainees' research competence has been the focus of numerous publications for over fifty years, leading to a broad consensus that it is not only an academic activity but also an integral part of teacher education, contributing to the development of reflective practitioners (Nopasari & Muarif, 2025). Its essence has been described by a number of native and foreign authors who defined its composition and the significance of each component (Borozan et al., 2025; Hine, 2013; Hrozan, 2015; Kravchenko, 2018; Kudla, 2020; Liubchak, 2013), as well as the ways and stages of its development (Black, 2021; Holovan, 2012; Kniazian, 2007; Mykhyda et al., 2020; Smith &

Sela, 2005). EAR bridges the gap between theory and practice: students come to understand the rationale behind teaching and learning, while learning to adapt methods and techniques to a specific educational context. As Darwin and Barahona put it, '...action research strategies are an evocative means of bringing nascent student capabilities to the foreground as theoretical knowledge is understood empirically through the reflective and enacting cycles of action research' (Darwin & Barahona, 2021, p. 2). That philosophy of learning by doing, substantiated by constructivists long ago, remains a valid basis for developing professional teachers' skills, including EAR skills.

Other benefits include developing a critical stance (Srivastava, 2022), taking multiple perspectives into account (Smith & Rebolledo, 2018), opening to new ideas (Hine, 2013; Messikh, 2020; Nopasari & Muarif, 2025), expanding the methodological repertoire, focusing not on problems but on pedagogical innovations able to solve them (Black, 2021; Kitchen & Stevens, 2008), and collaborating with student-teachers and school and university mentors (Moktar et al., 2024; Yan, 2016), which is conducive to later professional-community engagement. Including EAR in the pedagogical curriculum also enhances the principle of student-centredness, often declared but rarely fully realised. As Black notes, 'Practices involving young people as active agents in decision-making processes are scarce in education and educational research' (Black, 2021, p. 2). When pre-service teachers are engaged in EAR, the curriculum shifts from transmitting and memorising to a learning experience (Banegas & Consoli, 2019; Hagevik et al., 2012; Otto et al., 2009).

Another advantage of student EAR projects is their impact on the future teacher's personality, boosting self-confidence and resilience. Trainees become aware of their personal and professional growth as they respond to challenges, ask research questions, and find answers. They develop that sense of ownership of effective practices that Henson described nearly three decades ago (Henson, 1996). Students see the practical results of their research in improved classroom situations and learners' responses, which encourages further inquiry. Thus, teacher trainees become agents of change, change in the educational system and in their own practice as researchers.

Unsurprisingly, the ability to conduct EAR is now a requirement for validating teachers' profession in most international teaching standards. It is believed to enable 21st-century teachers to adapt to classroom diversity by selecting flexible learning strategies for their students' needs. Preparing pre-service teachers to identify problems, explore the current situation, develop a plan, select appropriate data-collection tools, and analyse and interpret data empowers them to become agents of change (Villacañas de Castro & Banegas, 2020).

Scholars have also identified several challenges in pre-service teacher action research: trainees' limited class-based experience and limited knowledge of action-research methods (Black, 2021; Jakhelln & Pörn, 2019; Sabri, 2022; Tatar, 2012); schoolteachers' reluctance to collaborate due to overload (Ferreira & Ryan, 2013); university teachers' lack of experience in EAR themselves, often leaving them unable to provide a positive role model (Zambo & Zambo, 2007); time pressures and weak university-school collaboration (Bryant & Bates, 2010; Bendtsen et al., 2019; Darwin & Barahona, 2021). Action research in a teacher-preparation programme can also strike stakeholders as too much extra work to add to an already crowded curriculum (Davis et al., 2017; Ponte et al., 2004). Together, these constraints diminish the quality of student teachers' EAR and, more often than not, turn it into a less effective learning strategy, hindering its use later in professional careers (Bryant & Bates, 2010).

METHODOLOGY

In our previous publications (Tuchyna & Kamynin, 2021, 2022) we focused on research competence as one of the components of student teachers' professional methodological competence and outlined the model of its development at H.S. Skovoroda Kharkiv National Pedagogical University, starting with guided lesson observation in Years 2–4, continuing with action research in Year 4 (Bachelor's programme), and doing EAR while preparing the Master's qualification work.

Following Smith and Rebolledo (2018), we treated EAR as a structured cycle of teacher-led inquiry: the exploration of a classroom puzzle, formulation of multi-perspective research questions, planned intervention, and reflective analysis. To be better prepared to scaffold and supervise our students' action research, we initiated EAR projects of our own within the 'Mentoring for EAR' programme. In particular, we considered a problem that has puzzled teacher educators in our Department of Foreign Philology: why do a number of future English teachers dislike reading? The number has, unfortunately, been growing.

A note on terminology. As we worked, we found that 'extensive reading' (in the Day & Bamford, 1998 sense – easy texts, large quantities, learner choice) and 'reading for pleasure' (a broader cultural-affective construct) were not synonymous in our students' experience. We therefore use 'reading for pleasure' as the broader construct our data engaged, while retaining the term 'home-reading' for the curricular session itself.

The study used a three-stage sample funnel. First, 88 Year 2–3 trainees in the Bachelor's programme consented to a questionnaire. Second, 46 of those (Year 2 students) wrote and submitted a short essay on home-reading sessions. Third, one teaching group of 15 (drawn from the 46) was observed during home-reading lessons. After quantitative and qualitative analysis of the collected data, the intervention was planned and implemented in that group, followed by reflection and interpretation. We note that the lesson observers were also the intervention designers; we addressed this insider position by triangulating across all three data sources and by debriefing with colleagues.

After discussions with colleagues from our university, from other Ukrainian universities (in Nizhyn and Uman), and from the University of Warwick, we formulated the research topic as: What factors do our students identify as motivating them to engage in reading for pleasure, and how are these factors reflected in their reading behaviours in class?

Following Smith and Rebolledo (2018), we framed the research questions from multiple perspectives to obtain more rounded and credible answers.

Teachers' perspective:

1. Why do we think our students are not motivated enough to read for pleasure?
2. Why do we want to motivate them to do so?

Students' perspective:

3. What do our students think about the reading materials assigned as home-reading tasks?
4. What reasons do they give for enjoying or not enjoying reading for pleasure?

Observed behaviour:

5. How actively do our students participate in in-class home-reading tasks?
6. Do students who report being highly motivated demonstrate different reading behaviours from those who report lower motivation?

Different tools served different perspectives. For our own teaching, we used post-lesson notes (quick jot-downs after each lesson), informal conversations with colleagues, and the literature on the psychology of reading. To capture students' opinions, we used an anonymous questionnaire with closed and open items, reflective writing (an essay 'What determines whether reading in English is a chore or a choice?'), and a post-intervention survey. To observe what students did in sessions, we used lesson recordings, peer observations by colleagues, teacher notes, and reflective discussion. Coding of essays was carried out collaboratively by three researchers; disagreements were resolved through discussion.

RESULTS OF THE EXPLORATORY STUDY

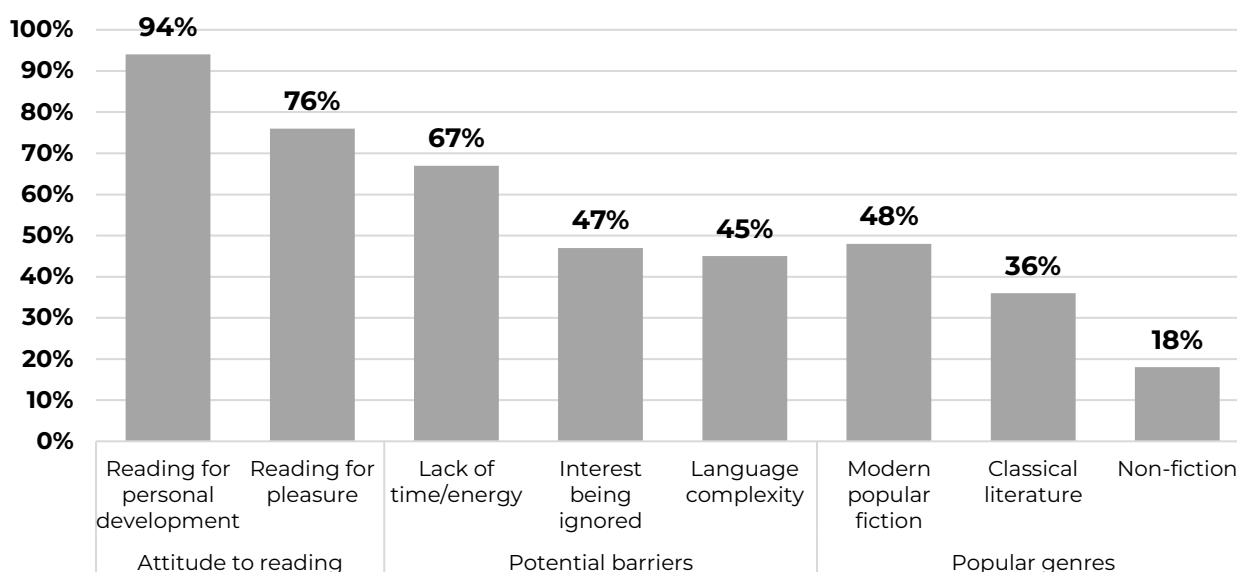
Conversations with colleagues surfaced a shared concern that reading is no longer part of our students' identity or social life. Accustomed to scrolling, memes, and TikToks, students often resist deep reading that requires sustained focus on long texts, and stick to summaries and videos. Many cannot see how the books they read speak to their experiences, ages, or identities. Overloaded with academic reading, they have developed an assessment-driven mindset in which reading for grades dominates reading for growth. We also acknowledged that the fault is not entirely the students': their educational experience has often framed reading as a task, a test, or a translation exercise. Pleasure reading, moreover, is rarely scaffolded into learning.

The cognitive and affective benefits of reading for pleasure are well documented. Children and adolescents who read more for pleasure score higher on cognitive tests and report better mental well-being (Sun et al., 2023). Reading is associated with stress reduction and empathy (Dow, 2022; Varao-Sousa et al., 2018), and bibliotherapy has shown promise in supporting mental health (Gualano et al., 2017). The 'flow' state often reported by absorbed readers (Csikszentmihalyi, 1990) reinforces this affective dimension. So, it is clear why we want to motivate our students to read more and find pleasure in the process. We now turn to the students' perspective.

The questionnaire (n = 88) assessed students' attitudes to the literature they encountered during the Bachelor's programme, the feelings those texts elicited, and the genres and topics that engaged them. Crucially, the data refuted our founding assumption: contrary to our preconception, a clear majority of students were aware of the potential of reading for their personal development (94%) and of the fact that reading could be done for pleasure as well as for an academic requirement (76%). The 'TikTok-distracted reader' framing was not borne out: 49% agreed that digital habits (scrolling shorter content) hindered their long-text reading, while 51% did not consider it a significant factor.

What students did identify as obstacles were teachers' choice of books that ignored their interests (47%), inadequate language complexity (45%), and a lack of time and energy after challenging home assignments in other subjects (67%). Genre preferences reflected diversity: modern popular fiction (thrillers, romance, fantasy, horror) (48%), classical literature (36%), and non-fiction (18%).

An interesting point concerned the role model set by teachers who discussed the books they had been reading with their students: 78% of respondents expressed their interest in such discussions. The survey results are summarised in Figure 1.

Figure 1*The results of the pre-intervention survey*

To probe further, the 46 essays (topic: When reading feels like a chore vs. a choice) were analysed through content coding, frequency counts, and thematic clustering. With $n = 46$, each student represents roughly 2.2%, so the percentages below should be read as approximate trends rather than precise distributions; themes are not mutually exclusive.

The results revealed clear patterns across the dataset, despite each student's unique experience. What makes reading enjoyable is not merely comprehension but a subtle interplay of choice, interest, language difficulty, emotional involvement, and freedom from academic pressure. The most dominant factor was personal interest ($\approx 93\%$). Students repeatedly emphasised that reading becomes enjoyable when 'the topic resonates with me,' 'I wanted to know what happens next,' 'I cared about the characters,' or 'the story felt meaningful.' This emotional connection often created a sense of flow in which students 'forgot they were reading in English at all.' Interest was consistently more important than language level.

Nearly nine out of ten students ($\approx 89\%$) explicitly contrasted pleasurable reading of self-chosen texts with experiences of reading under compulsion: assigned texts, strict deadlines, forced analysis, pressure to 'get through pages.' Such texts were described as 'boring,' 'heavy,' 'draining,' 'mechanical,' and 'a burden.' Self-chosen texts, novels, short stories, blogs, preferred genres, were experienced as relaxing, enjoyable, and intrinsically motivating. Clear genre preferences emerged in $\approx 84\%$ of essays: romance and YA novels, fantasy, thrillers, detective stories, modern fiction, blogs, and personal essays were associated with pleasure; academic articles, theoretical readings, classical literature in archaic English, and any scientific papers were associated with obligation. Modern narratives felt 'alive,' 'dynamic,' and 'easy to follow,' while academic texts felt 'dense,' 'technical,' and 'soulless.'

A major barrier, mentioned by $\approx 78\%$, was excessive linguistic complexity: long sentences, unfamiliar vocabulary, archaic syntax, and a constant need for a dictionary. When a text matched their level, students could guess meaning from context and maintain motivation; when it exceeded their threshold, reading became a 'slow, tiring decoding task.' A powerful feeling of immersion (the 'flow effect') was reported by $\approx 70\%$: 'time disappeared,' 'I didn't notice I was reading in English,' 'I read longer than planned.' This state occurred only when interest, manageable language, and freedom of choice

intersected. More than half ($\approx 57\%$) associated academic reading with pressure to understand every detail: stopping frequently, analysing every line, translating compulsively, fearing misunderstanding. Some essays ($\approx 41\%$) revealed how confidence shapes students' relationship with English texts: insecurity about being 'not ready,' pride at finishing their first book, motivation from noticing progress, and a sense of 'empowerment' when they understood without help.

Across all essays, a shared definition emerged. For these learners, reading for pleasure is the freedom to choose the text; the ability to understand without constant translation; reading that is relevant, meaningful, or emotionally resonant; a feeling of immersion rather than obligation; an experience driven by curiosity, not pressure. Reading is a choice when learners can explore, imagine, and connect. Reading is a chore when they decode, analyse, memorise, or race toward a deadline. The clear contrastive patterns are summarised in Table 1.

Table 1

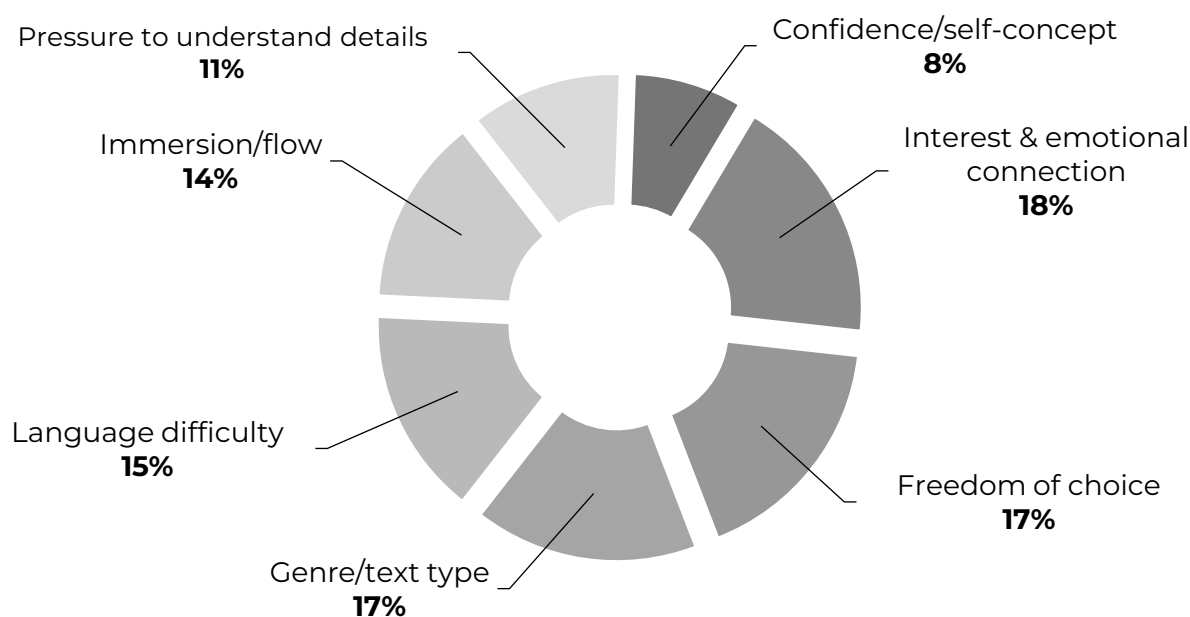
Contrastive patterns: pleasure vs. chore.

When reading feels like a chore	When reading feels like a choice
The text is assigned.	The student selects the text freely.
The deadline is fixed.	Curiosity drives the process.
The topic is uninteresting.	The genre reflects their tastes.
Language is archaic, technical, or dense.	Language is clear enough to follow.
There is pressure to analyse or translate.	Students feel emotionally connected.
Reading is done "to survive the class," "to finish," or "to avoid failing."	Reading is linked to personal development or enjoyment.

The contrast suggests that pleasure is not an inherent quality of a book, but a learner-dependent experience shaped by motivation, mood, and perceived autonomy. Taken together, the survey results and the essay analysis enabled us to highlight the factors that turn reading from a solely academic task into an act of enjoyment. The overall distribution of factors influencing 'reading for pleasure' is presented in Figure 2.

Figure 2

Factors influencing reading for pleasure



Observation of three lessons confirmed that purely linguistic activities did not lead to active engagement from all learners. Although students supported the activities devised by their peers (their home assignment was to do the same in turn), the process felt rather boring. The very fact that the activities they suggested aimed at decoding and analysing the language proves that this has been a common practice in home reading. Students had become accustomed to activities that focused on recalling facts and on developing grammar and vocabulary. The teacher tried to use activities that could serve as a springboard to speaking and reflecting by setting tasks on controversial topics connected to students' experiences, but linguistic activities that tested factual comprehension still prevailed. Lengthy discussions of certain phrases in the text negatively affected group dynamics and shifted the lesson towards a teacher-centred approach.

The fact that the students did not know classical English literature well was revealed again when the teachers asked them about Charles Dickens, mentioned in the novel. Not all of them knew who he was. One girl remembered that she had read his *A Christmas Carol* (in plural), and called him the author of children's literature. Another remembered having read *Oliver Twist* (mistakenly referred to as *The Adventures of Oliver Twist*) and having seen the film. The teacher did well to allow students to choose what they would read and discuss during home-reading sessions. The students' choice of reading material, the modern fantasy novel *Babel: Or the Necessity of Violence* by R.F. Kuang, was a definite plus.

An important negative finding emerged from comparing self-report and observation: some students who claimed not to be avid readers participated actively in class, while others with high self-reported motivation for pleasure reading were not visibly engaged in the lesson. The gap between self-reported affect and observed behaviour deserves further investigation; it is also a methodological caution for any survey-based reading research.

PLANNING AND IMPLEMENTING THE INTERVENTION

After the exploratory phase, we designed an intervention along two dimensions: (a) the cognitive–conceptual content of classroom work (what students were invited to think about) and (b) the interactional structure (how they engaged, collaborated, and co-constructed meaning). The text was R.F. Kuang's novel *Babel: Or the Necessity of Violence* (2022), already chosen by the group during home-reading.

(1) Content transformation: visualised meaning-making and conceptual scaffolding. We visualised students' thinking processes through Canva-based interactive boards. Key stages of interpretation (plot development, emotional response, identity construction, conceptual questioning) were displayed visually so students could observe, track, and reflect on how meaning unfolded.

A timeline-based representation of the previous chapter turned linear plot recall into dynamic conceptual mapping: students traced causal links between events, located emotional turning points, identified ideological tensions (colonial power, racial prejudice, epistemic authority), and saw how minor details contribute to the novel's larger architecture. An identity-focused infographic structured discussion around components of identity (name, ancestry, language(s), education, social position, emotional memory, allegiance), helping students move from plot retelling to interpretive synthesis.

(2) Activity design: from reproductive tasks to interpretive and affective engagement. We introduced interactive, multimodal, and emotionally resonant tasks. Symbolic visual

prompts (silver bars, bread, books, Oxford, chessboard, sloth, pike) invited students to decode meaning metaphorically: instead of identifying what happened, they explored what these objects represent in terms of epistemic power, colonial hierarchy, intellectual discipline, and identity transformation.

An interactive emotion-tile activity asked students to choose hidden emotions and link them to Robin's and Ramy's experiences as well as their own memories, building affective bridges between self and character.

We reduced mechanical comprehension checks (vocabulary matching, true/false statements, sequencing, character matching) and replaced their dominance with tasks of conceptual interpretation, emotional inference, ethical reflection, and ideological critique. This shift repositioned students from passive reproducers of textual information into active co-constructors of literary meaning.

(3) Classroom dynamics: lowering the affective filter. We integrated pair work and small-group collaboration (groups of three) systematically, on the hypothesis (Krashen, 1985) that smaller, supportive spaces lower the affective filter, increase psychological safety, reduce performance anxiety, and promote communicative confidence.

INTERVENTION FINDINGS AND DISCUSSION

Lesson observation during the intervention phase, and our reflection on it, revealed the following. The tasks shifted the focus to personal relevance in the analysis of plot, characters, and themes. Controversial themes (e.g., national identity) were built around opinion gaps and so produced interactive engagement.

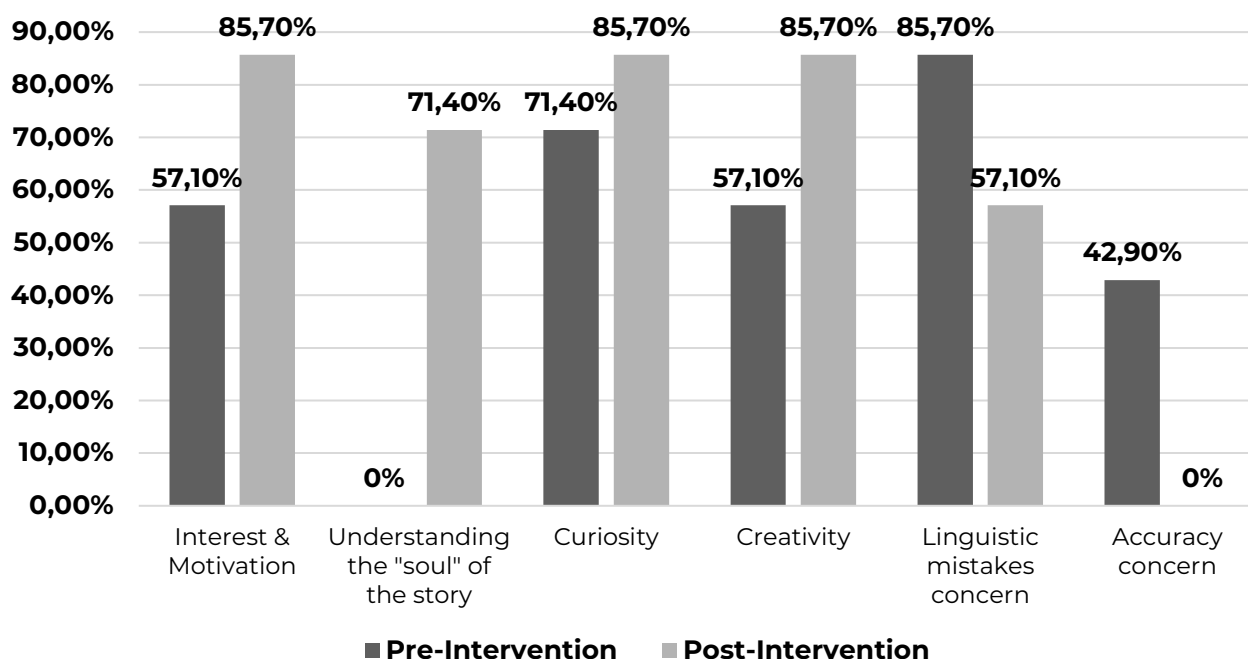
Tasks required not just reading on the lines but also between and beyond them, while learners still had to return to the text to support their views. Observation confirmed growing engagement as the focus shifted from language to conceptual mapping.

Uploading tasks to Canva whiteboards gave constant visual support (verbal and non-verbal: pictures, tables, mind maps) and increased task accessibility. Creative tasks (e.g., generating a portrait of the main character using AI) raised motivation and developed digital skills. Gamification (a Jeopardy game, an artists' competition) sustained interest.

We traced a number of emerging tendencies: a gradual increase in both the quantity and quality of student talk; more extended and reflective contributions; a shift from predominantly monologic teacher-student exchanges toward more dialogic interaction; and the gradual development of peer support in pair and small-group work. This collaborative framework facilitated distributed cognition, enabling students to co-build interpretations, challenge assumptions, and refine ideas collectively.

Taken together, the modifications produced observable shifts in the lesson's learning ecology. The classroom atmosphere moved from reading as an academic burden and a survival strategy toward reading as an intellectual exploration and an emotional journey. Students exhibited heightened cognitive engagement, deeper emotional involvement, increased communicative initiative, and stronger interpretive confidence. The intervention repositioned literary reading as an experiential, dialogic, meaning-rich process.

The post-intervention survey (n = 15) captured changes in students' feelings and attitudes, summarised in Figure 3.

Figure 3*The results of the post-intervention survey*

The content-based approach helped improve students' overall attitude toward home reading, reduce anxiety about accuracy, and unlock creativity. By replacing mechanical drilling with narrative-based investigation, students moved from word-for-word decoding toward meaning-focused interpretation. Over 70% of participants reported a decreased reliance on translation tools, and their explanations suggest they now see reading as a tool for 'inspiration' rather than just a 'vocabulary source'.

Limitations. We name several constraints openly. First, the intervention was a single-group design with no control over its composition; novelty effects, demand characteristics, and the additional teacher effort invested in these lessons could each contribute to the observed shift, on top of any effect of the design itself. Second, the lesson observers were also the intervention designers; we mitigated this insider position by triangulating across questionnaire, essay, and observation data, but cannot eliminate it. Third, with $n = 46$, the essay percentages should be read as approximate trends rather than precise distributions. Fourth, the research was conducted within a single department, so generalisations to other contexts must be made with care.

CONCLUSION

The data show that reading in English becomes pleasurable when three conditions align:

1. Autonomy (choice of text): the student chooses what, when, and how to read.
2. Alignment (interest and personal relevance): the topic, characters, and themes feel meaningful.
3. Accessibility (appropriate linguistic difficulty): the text is comprehensible enough to allow immersion.

When any of these elements is missing, especially autonomy, reading shifts from an emotionally rewarding activity to an exhausting academic obligation. This trio echoes self-determination theory's autonomy-competence-relatedness triangle (Ryan & Deci, 2000) and confirms in our context what that literature predicts: intrinsic motivation grows when autonomy, competence, and personal relevance are present.

The project reshaped our understanding of how to support pleasure-based reading. Teachers should prioritise texts that match individual interests rather than one-size-fits-all assignments; help students build confidence by offering graded options and scaffolded support; create space for students to choose genres, explore modern narratives, and experience 'flow' (Csikszentmihalyi, 1990); and develop academic reading skills separately from reading-for-pleasure routines so that students do not associate English solely with stress. We now understand that students do not need to love reading to enjoy it; they need the right conditions to feel engaged, free, and connected.

The EAR cycle also helped us, as teacher educators, better understand both the benefits of action research and the challenges our students face at each of its phases. The experience will be invaluable for mentoring and scaffolding their research during teaching practice; those scaffolds will include guided observations, sessions on data collection and analysis, project templates, and discussions of project outlines. Our experience confirms once again that exploratory action research is a powerful tool in teacher education: it can improve teaching and learning and support students in becoming agents of change.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest regarding the publication of this paper.

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ARTIFICIAL INTELLIGENCE STATEMENT

Generative AI tools were used to assist with the organisation of qualitative data and with English-language editing and stylistic improvement. The authors reviewed and revised all AI-suggested outputs; final coding decisions, interpretations, and conclusions are entirely the authors' own.

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INVESTIGATING INFLUENCE OF CHATBOT ON STUDENT LEARNING AT ONE OF THE RURAL UNIVERSITIES IN SOUTH AFRICA

ДОСЛІДЖЕННЯ ВПЛИВУ ЧАТ-БОТІВ НА НАВЧАННЯ СТУДЕНТІВ
В ОДНОМУ З СІЛЬСЬКИХ УНІВЕРСИТЕТІВ ПІВДЕННОЇ АФРИКИ

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ABSTRACT

Purpose. The purpose of this research is to examine the impact of chatbot technology on students' learning at Walter Sisulu University (WSU), South Africa. As artificial intelligence becomes increasingly integrated into higher education, chatbots have emerged as potential tools to support learning, improve

Мета. Метою цього дослідження є вивчення впливу технології чат-ботів на навчання студентів в Університеті імені Вальтера Сісулу (WSU), Південна Африка. Оскільки штучний інтелект все більше інтегрується у вищу освіту, чат-боти стали потенційними інструментами для підтримки навчання, покращення

engagement, and offer real-time academic assistance.

Methodology. This study employed a mixed-methods approach, combining quantitative surveys distributed to undergraduate students with qualitative interviews conducted with both students and academic staff.

Results. The findings indicate that chatbots enhance students' learning by providing immediate responses to academic queries, promoting self-directed learning, and improving access to learning materials. However, challenges such as inconsistent internet access, limited digital literacy, and low awareness of available chatbot tools were identified as barriers to effective use. The study also revealed a general willingness among students to adopt chatbot-assisted learning if better support and training were provided.

Conclusions. These results suggest that while chatbot technology holds promise for improving educational outcomes, successful implementation at WSU requires addressing infrastructural and support-related challenges. The findings provide valuable insights for university policymakers, educators, and developers aiming to optimize AI-driven tools for enhanced teaching and learning in under-resourced educational contexts.

Keywords: artificial intelligence, chatbot-assisted learning, enhanced teaching and learning, learning pedagogy, rural university, technology.

залученості та надання академічної допомоги в режимі реального часу.

Методологія. У цьому дослідженні використовувався змішаний методологічний підхід, що поєднує кількісні опитування, розповсюджені серед студентів, з якісними інтерв'ю, проведеними як зі студентами, так і з викладачами.

Результати показують, що чат-боти покращують навчання студентів, надаючи негайні відповіді на академічні запити, сприяючи самостійному навчанню та покращуючи доступ до навчальних матеріалів. Однак такі проблеми, як нестабільний доступ до Інтернету, обмежена цифрова грамотність та низька обізнаність про доступні інструменти чат-ботів, були визначені як перешкоди для ефективного використання. Дослідження також виявило загальну готовність студентів використовувати навчання за допомогою чат-ботів, якщо їм буде надано кращу підтримку та підготовку.

Висновки. Результати свідчать про те, що хоча технологія чат-ботів є перспективною для покращення результатів освіти, успішне впровадження в університеті вимагає вирішення інфраструктурних та допоміжних проблем. Результати дослідження надають цінну інформацію для розробників університетської політики, викладачів та фахівців, які прагнуть оптимізувати інструменти на основі штучного інтелекту для покращення викладання та навчання в освітніх контекстах з недостатніми ресурсами.

Ключові слова: штучний інтелект, навчання за допомогою чат-ботів, покращене викладання та навчання, педагогіка навчання, сільський університет, технології.

INTRODUCTION

Technology has always played a significant role in the growth of education, with each stage bringing new tools and approaches to improve learning opportunities (Ghavifekr & Rosdy, 2015; Mathew & Ibrahim, 2023; Priante & Tsekouras, 2025). Physical classrooms, literature, and in-person contact between students and teachers have always been attributes of education (Malik & Rizvi, 2018; Priante & Tsekouras, 2025). The necessity to adapt and use these developments to better serve their students has been recognized by educational institutions as technology has become more pervasive in our daily lives (Mhlanga, 2024). As a result of this realization, chatbot student assistants are being investigated to offer individualized and accessible support (Kooli, 2023). The integration of chatbot student assistants into educational settings is one of the most promising recent technological advances for promoting student success.

Chatbots for student assistants can fill the vacuum of traditional methods in education by providing immediate access to information, knowledge, tools, ad-vice, and support, as well

as fostering student engagement (Esan & Masombuka, 2025; Kaiss et al., 2023). The development of chatbots for student assistance is a result of artificial intelligence (AI) and natural language processing (NLP) technologies quick advancement (Ayanwale & Ndlovu, 2024). These chatbots are made to have engaging discussions with users, mimicking human-like interactions while taking use of automation's effectiveness and scalability.

Several higher education Institutions (HEIs) are striving to overcome several difficulties that students frequently encounter in their first-year experience by introducing different interventions and integrating these chatbots into educational settings (Esan & Esan, 2025; Michel-Villarreal et al., 2023). The incorporation of chatbot student assistants has the potential to transform conventional support systems in the current dynamic educational environment. The progression of education through chatbot student assistants can lead to more excellent student performance and a more inclusive learning environment with careful design, the collaboration between educators and technical specialists, and continual evaluation (Ndunagu et al., 2025).

A considerable body of research has been done on understanding the many components of support services, their effects on student outcomes, and methods for boosting student success, according to numerous works in the literature on student support in higher education (Chetty & Kepkey, 2023; Johnson et al., 2022). Student, social, emotional, and career-related aspects of holistic student support are all important, according to research. According to Seboe (2023), counselling and advising services are associated with better course selection, higher levels of student engagement, and timely degree completion. The study further found that individualized counselling positively influences both academic achievement and student satisfaction. Similarly, Mvikweni and Mthengi (2025) emphasized that support services play a crucial role in student retention and graduation rates. This finding is consistent with Oripova's (2022) argument that students who receive adequate support services are more likely to persist in their academic programmes. Furthermore, Johnson et al. (2022) found that students who utilize support services demonstrate higher levels of participation in extracurricular activities and campus events.

Active participation improves the overall college experience and fosters a feeling of community. Remote delivery of academic resources, career services, and counseling is made possible by online platforms and technological tools (Gray & DiLoreto, 2016). Technology can enhance accessibility and facilitate direct access to information, supporting students, particularly those in their first year of university. Outside of usual business hours, chatbots can help by accommodating different schedules and time zones. Chatbots can provide individualized advice and suggestions by examining user learning patterns and preferences. Students can avoid irritation and stay on task by receiving immediate feedback and responses to their questions.

The integration of artificial intelligence (AI) into educational settings has attracted significant scholarly attention in recent years, particularly the use of chatbots as pedagogical tools. Chatbots AI-driven conversational agents have shown promise in enhancing student engagement, providing immediate feedback, and supporting personalized learning experiences (Chakraborty et al., 2023; Williams, 2024).

Several studies have explored the educational implications of chatbots in diverse academic contexts. Laun and Wolff (2025) found that chatbots facilitate learner autonomy and contribute to improved academic performance when embedded in learning management systems. Similarly, a study by YetiŞensoy and Karaduman (2024) highlighted that students perceived chatbots as non-threatening tools that helped them engage more actively with

learning materials. Furthermore, systematic reviews by Okonkwo and Ade-Ibijola (2021) and Kuhail et al. (2023) showed that chatbots support learning through interactive question-and-answer formats, thereby increasing students' motivation and satisfaction. However, most of these studies have been conducted in technologically advanced settings where students have consistent access to digital devices and high-speed internet conditions not uniformly present in many African universities.

In the African context, research on chatbots in education is emerging but still limited. A study by Suleiman et al. (2025) examined the application of chatbots in Nigerian universities and found that they have the potential to improve administrative communication, although their pedagogical use remains limited. In South Africa, Patel and Ragolane (2024) discussed the broader application of artificial intelligence in higher education, emphasizing infrastructural constraints and limited digital literacy as significant barriers to adoption. Despite South Africa's relatively advanced educational technology infrastructure compared to other sub-Saharan countries, there is minimal empirical research specifically focusing on how chatbots impact student learning experiences, academic performance, or engagement especially in historically disadvantaged institutions like Walter Sisulu University (WSU).

Walter Sisulu University, being a comprehensive university catering to a diverse student population, presents a unique context where digital tools can bridge gaps in accessibility and student support. Preliminary institutional reports and anecdotal evidence suggest that while digital tools are used for administrative support and blended learning, the educational integration of AI tools such as chatbots is either nascent or experimental.

To date, there is no comprehensive empirical study examining the impact of chatbots on students' learning in Walter Sisulu University. While international literature demonstrates the benefits of chatbots in education, and some regional studies explore administrative uses of AI, the pedagogical implications, effectiveness, and student perceptions of chatbots at WSU remain unexplored. Therefore, this study aims to bridge the gap between global knowledge and local application by evaluating how chatbot integration influences learning outcomes and experiences in this specific institutional context using the concept of Unified Theory of Acceptance and Use of Technology (UTAUT) as its theoretical framework (Esan & Masombuka, 2025; Esan & Esan, 2025).

The **purpose** of this research is to examine the impact of chatbot technology on students' learning at Walter Sisulu University (WSU).

Hence, the research contributions are as follows:

- Empirical investigations into the effectiveness of chatbot technologies in enhancing student learning outcomes within a rural South African university context. While existing literature on educational chatbots is largely concentrated in urban settings, this research offers context-specific insights into how students in resource-limited environments interact with, benefit from, and perceive chatbot tools integrated into their academic support systems.
- The development of new frameworks for educational chatbots that integrate cultural and socio-economic background into existing UTAUT framework, to align with the digital realities of rural South African students.

METHODOLOGY

A prototype design in combination with a qualitative research method (focus groups) is employed to collect more in-depth information on the students' experience with the

chatbot. The developed prototype was similarly to (Tudor et al., 2025), the design also aids first-entering students in getting the necessary information that they need in when enrolling at a university. The proposed design allows students to get assistance with queries about the course offered, admin-related stuff, financial services, counselling service, library departmental contact, and many other queries related to them familiarizing themselves with the university.

In this study, we utilized the concept of unified theory of acceptance and use of technology (UTAUT) which is a comprehensive framework developed in (Esan & Esan, 2025; Venkatesh et al., 2003) to explain user behavior regarding the use of technology. We also used the UTAUT variables to design questionnaire based on the chatbot technology which was distributed to student via google form. Out of 180 students only 153 students were able to give their responses. The questionnaire with the prototype were distributed to undergraduate students who were in their first, second and third year in the Department of Information Technology at Walter Sisulu University (WSU). We chose how the chatbots would respond to each kind of query based on the length of the interactions. Some can be answered directly via chat, while others must be directed to human assistance.

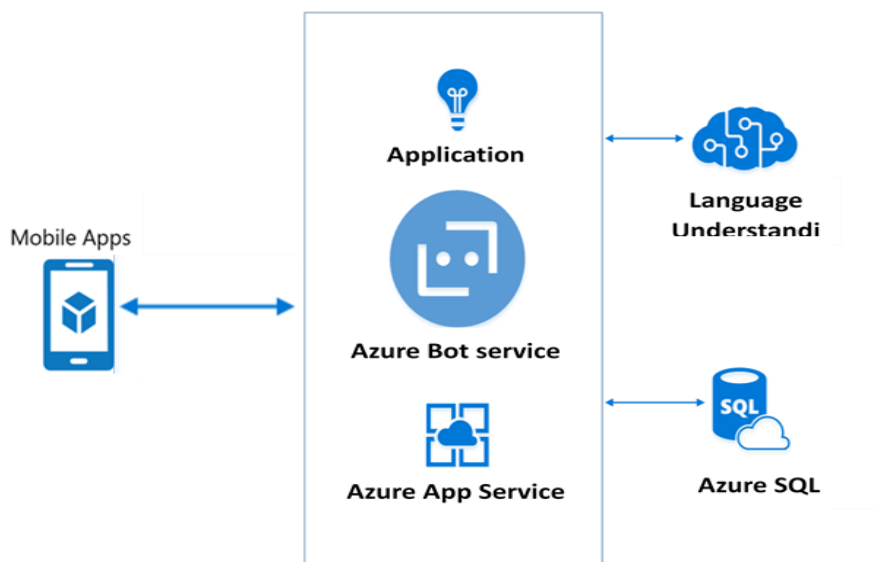
Then, to build and host the chatbots we had to use the Azure bot service, we chose and employed a bot development engine using the mobile application. We compared the chatbot prototypes to the potential benefits we had found in the literature and from our prior work experience to review the chatbots and determine whether the main advantages we had found could truly be supported by the existing structure for implementation.

CHATBOT STUDENT ASSISTANCE PROTOTYPE

A smartphone is used by the user (student) to access the chatbot, the user (student) is authorized by means of Azure App Service, the user (student) interacts with the bot service and asks for availability information using a specific number on the phone, the chatbot replies with the answer in a SQL database once the user (Student) is satisfied with the result and to assist the DevOps team in enhancing bot performance and utilization, Application Insights collects runtime telemetry throughout the process. The architecture for the proposed design Chatbot is shown in Figure 1.

Figure 1

Proposed architecture of the student assistant chatbot



The data collected for this study was analyzed using the statistical package for the social sciences (SPSS). The appropriate statistical techniques were used to assess the gathered data. For the efficient analysis of quantitative data, SPSS is user-friendly and supports the researcher through any challenges that may arise. In SPSS, a set of variables must be defined, and cases must be further created by appropriately entering data into these variables. Examples of these include the moderator, intervening, dependent, and independent variables. An independent variable, to put it simply, is a cause whose value is unaffected by any other variables in a study.

A dependent variable, on the other hand, is an effect whose value is contingent upon any modifications to the independent variable. An intervening variable, also known as a mediating variable, is a hypothetical variable that is typically employed in research to elucidate the causal relationships between other variables. Finally, the variable that has the ability to change the relationship between independent and dependent variables is known as the moderating variable. A descriptive statistical method was used to show the frequencies and percentages of the respondents' demographic profiles. Correlation analysis was performed to look into the relationships between the variables. Analysis of variance (ANOVA) and regression analysis were used to test the model. The analysis of the study focused mostly on the intentions of the students. For the qualitative, we interviewed the students who were given the prototype and obtained their insight on the use of the chatbot for teaching and learning. Their responses are shown in following sections.

RESULTS

This section presents the results and findings obtained from this study while using the proposed UTAUT model to investigate the impact of chatbot technology in one of the tertiary institutions in South Africa.

Respondent's demographic

Among the participants, 65.4% were female and 34.6% were male. The age distribution of participants was as follows: 99.3% were aged between 17 and 25, which is the majority and the reason is because most of these students are undergraduate students, while 0.7% were between 26 and 35. In terms of grade levels in qualifications, 37.9% were in first year, 19.8% were in second year, 42.5% are in third year (final year), as illustrated in Table 1.

Table 1

Demographic characteristics of respondent (n = 153)

Demographic	Frequency	Percent (%)
Gender		
Female	100	64.5
Male	53	34.6
Age		
17 – 25	152	99.3
26 – 35	1	0.7
Levels of study		
First year	58	37.9
Second year	30	19.8
Third year	65	42.5

Reliability and Correlation Analyses

This study employed construct validity to determine the extent of correlation between the decision variables and other measures that are theoretically expected to be related to them. Before testing for construct validity and correlation, the decision variables were assessed for reliability.

The internal consistency of these variables was evaluated using Cronbach's alpha (α) and correlation matrix (Adamson & Prion, 2013). The questionnaire items underwent an item analysis to evaluate the internal consistency of the decision variables. Cronbach (α) values, which indicate the reliability of the questionnaire, were obtained by performing this analysis for each construct. Items in the questionnaire were either included or excluded based on the following three criteria: Cronbach alpha (α) greater than 0.8 ($\alpha > 0.8$) was viewed as indicating strong reliability, Cronbach alpha (α) ranging from 0.6 to 0.7 was seen as acceptable reliability, and Cronbach alpha (α) below 0.6 ($\alpha < 0.6$) was regarded as indicating unacceptable poor reliability. The summary of the reliability data for each component factor of the research instrument is provided in Table 2.

Table 2

Robust check

Constructs	Cronbach Alpha (α)	Average Variance Extracted (AVE)
Perceived Usefulness	0.71	0.55
Effort-Efficiency	0.76	0.67
Social Influence	0.79	0.71
Facilitating Conditions	0.84	0.82
Internet cost	0.89	0.82
Culture Influence	0.91	0.82

Table 2 displays Cronbach's alpha (α) values for the items associated with each construct. It is important to note that only the items deemed acceptable are included in this table. A Cronbach α greater than 0.8 is considered to indicate strong reliability, as it demonstrates high internal consistency among the items within a construct (Esan & Esan, 2025).

The three constructs facilitating condition (3 items), internet cost (4 items) and cultural influence (3 items) also showed a high internal consistence with respective adjusted Cronbach alpha measures of 0.84, 0.89, and 0.91. The constructs such as perceived usefulness ($\alpha = 0.71$), self-efficacy ($\alpha = 0.74$) and social influence ($\alpha = 0.76$) have moderate threshold which is still acceptable reliability and sufficient for this study (Cheung et al., 2023).

Finally, average variance extracted (AVE) values, which are a measure of variation explained by the latent variable to random measurement error ranged from 0.55 for perceived usefulness to 0.82 for facilitating condition, internet cost and cultural influence, which is higher than the threshold of 0.60 (Polyportis & Pahos, 2024).

Correlation Analyses

A correlation matrix was computed to assess the degree of relationship between various constructs. The correlation coefficient (r) shows the strength of the relationship between

two numerical variables, and correlation is a statistical measure of the linear relationship between two variables (Schober et al., 2018).

The magnitude of r signifies the degree of correlation between the two variables. Consequently, a stronger relationship exists when r has a greater absolute value. The following guide was used for this study: 1 denotes a perfect correlation, 0.8 indicates a high degree of correlation, a correlation of 0.60 is considered moderate, a weak correlation is indicated by a value of 0.185, and 0 indicates no correlation. The results of correlation analysis to verify the proposed relationship among variables is shown in Table 3.

Table 3

Correlation matrix showing relationship between variables

Construct	PU	FC	SI	EE	SB	CI	SE	IC
PU	1							
FC	0.358	1						
SI	0.421	0.628	1					
EE	0.300	0.652	0.594	1				
SB	0.213	0.414	0.462	0.488	1			
CI	0.368	0.264	0.421	0.509	0.512	1		
SE	0.423	0.322	0.529	0.643	0.725	0.718	1	
IC	0.185	0.191	0.058	0.689	0.607	0.611	0.683	1

The investigation of potential correlations between the various variables was done using a Pearson correlation analysis. The variables observed were perceived usefulness, facilitating condition, social influence, effort expectancy, socio- economic background, cultural influence, and internet cost.

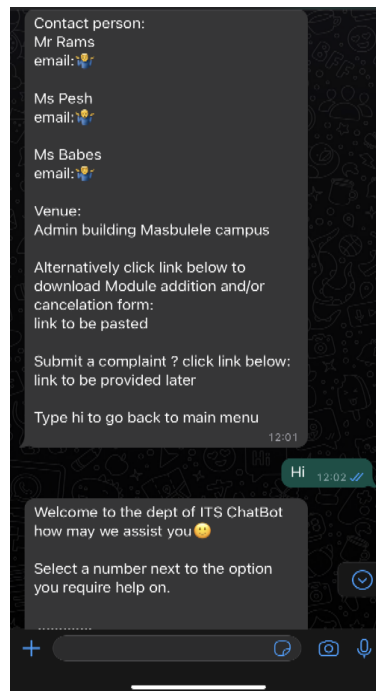
All of the variables correlate to one another at $r = 1$, according to the Pearson correlation results. The strong positive correlation between SI and FC was found, with $r = 0.628$ and $p < 0.0001$. Also, there is a strong positive correlation between the following constructs: SE and SB with $r = 0.725$, SE and CI with $r = 0.718$. Positive, meaningful relationships with a moderate level of intensity fall into the second category of relationships. Significant at $p < 0.0001$, these relationship strengths fall within the range of $0.607 > r < 0.689$.

Qualitative Results

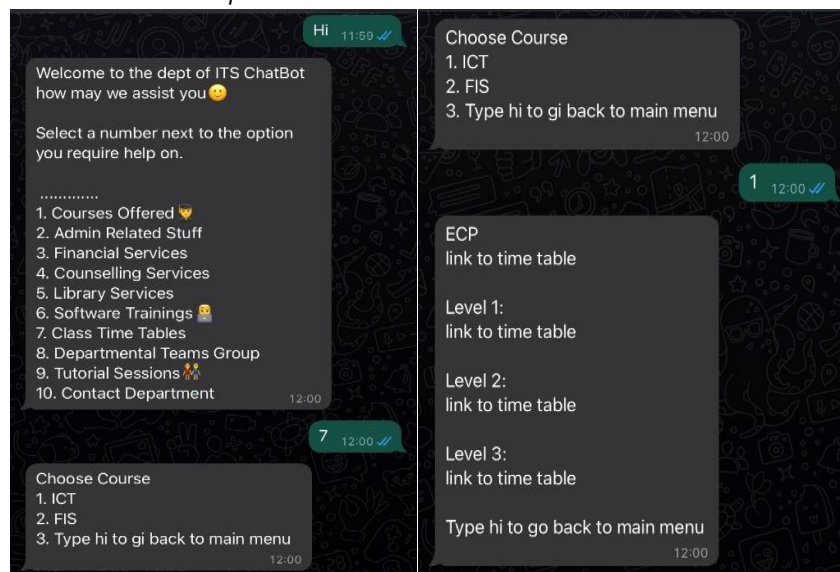
This section provides the qualitative results of the research and discuss the different designs used as prototypes for student assistant chatbots and provide discussion of the results.

Student Assistance Chatbot Admin Prototype 1

To help students at different stages of their studies learn more about the department, we developed a chatbot. The chatbot in this platform serves as an administrator who wants to help students find information for the various levels of study they have enrolled for with the department. Students must communicate with this virtual administrator and ask for the information they require. Students must successfully present a proper number that corresponds to the level at which they require the information to receive accurate information. Several conversation messages are shown in Figure 2.

Figure 2*Student assistant chatbot admin***Student Assistance Chatbot Helpdesk Prototype 2**

As a department inside the university, we frequently receive fresh requests from our students. Sometimes, because of heavy workloads and staff limitations, our administration section's helpdesk is unable to react to these requests in a timely manner. To address frequently asked questions, respond to simple requests, and assist students in properly sending helpdesk requests to the appropriate teams, a helpdesk bot was established. Several chat messages are displayed in Figure 3.

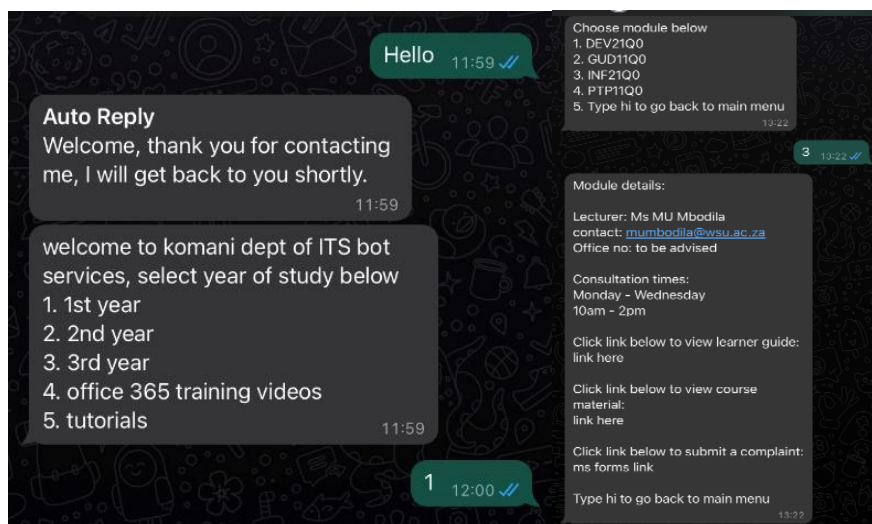
Figure 3*Student assistant chatbot helpdesk***Student Assistance Chatbot Module Detail Prototype 3**

A reading list bot has been created to assist students in obtaining information about a newly launched program in the department, such as the program name, modules, names of the lectures, learner guides, and other material required for the program.

A reading list for each of their programs can be created using various pieces of information. Based on the information supplied in the list, students can examine these lists, which inform them precisely what they are doing, the name of the lecturer, consultation time, timetable, and how to access additional pertinent materials. Students will receive instructions on how to use the information from the chatbot, which will serve as a guide. Several chat messages are displayed in Figure 4.

Figure 4

Student assistant chatbot module details



Below there are some representative examples of student statements confirming the positive viewpoints.

Easy to Use

"Using the chatbot was really easy. I didn't need any special instructions; it was pretty intuitive. I just typed my question, and it responded within seconds. It felt a lot like texting, which I'm already used to. I liked that I didn't have to go through a long process to access help; no logging into a separate system or waiting for office hours. Everything was right there. Sometimes it misunderstood my question if I wasn't clear, but I could rephrase it and still get what I needed. Overall, it saved me time and made learning feel more flexible and on-demand."

Self-Efficacy

"At the beginning, I wasn't sure if I'd be able to use the chatbot properly; I thought maybe it was meant for more tech-savvy people. But once I tried it, I realized it was actually quite simple. The more I used it, the more confident I became in asking the right questions and understanding how to get useful responses. Now, I feel like I can use it efficiently to support my learning, especially when I need quick explanations or practice questions. It's made me feel more independent; I don't always have to rely on the teacher or classmates. I've learned how to guide my own learning through the chatbot, which makes me feel more in control."

Perceived Usefulness

"At first, I was a bit skeptical about using a chatbot for learning; it felt kind of impersonal. But once I started interacting with it, especially for quick explanations or revision questions, I realized how convenient it was. I could ask questions at any time, even late at night, and still get an answer instantly. That really helped with my understanding, especially in subjects where I needed

repetition to grasp the concepts. It's not the same as talking to a real teacher, but for quick help or clarifications, it was very useful. Sometimes the answers were a bit generic, but overall, it made learning more accessible and less intimidating. I actually felt more confident asking questions to the chatbot than in class."

Effort-Expectancy

"Honestly, I didn't find it hard at all to use the chatbot. It felt very natural, kind of like using any messaging app. I didn't need any special training or instructions; it was just type and go. The interface was clean and straightforward, and the responses came quickly. I think anyone with basic digital skills could use it without much effort. I also appreciated that I didn't have to scroll through long menus or complicated options; it just worked. So, in terms of effort, it was minimal, which made me more willing to keep using it regularly."

Voluntariness of Use

"Using the chatbot wasn't something we were forced to do; it was totally optional. I actually appreciated that, because it gave me the freedom to explore it at my own pace. Some of my classmates didn't use it much, but I found it helpful, especially during revision. Knowing that it was available but not mandatory made it feel less like a burden and more like a helpful tool I could turn to when I needed extra support. I think because it wasn't imposed on us, I was more open to trying it and sticking with it."

Social Influence

"Initially, I wasn't sure about using the chatbot for my studies. However, after seeing several classmates actively engaging with it and sharing their positive experiences, I felt encouraged to give it a try. Our instructor also highlighted its benefits during lectures, which further motivated me."

Observing others use it effectively made me realize its potential value, and I didn't want to feel left out or miss out on a helpful resource. This collective enthusiasm created a supportive environment that influenced my decision to incorporate the chatbot into my learning routine."

Overall, the students were satisfied with the instantaneous and immediate responses they received to inquiries during chats. They were generally welcoming the usage of the chatbot as a learning tool. They didn't encounter delayed responses to their questions asked within the chat platform compared to their experiences with the instructor, where their questions may have received a delayed response or no answer at all. Despite this positive feedback, student highlighted some negative viewpoints on the integration of the chatbot in their learning, which can be summarized in the statements below:

Repetitive and Irrelevant Responses

"My experience with the chatbot was not pleasant. I realized I was getting similar answers to the variety of questions I asked during the chat sessions."

Frustration Due to Misunderstandings

"Sometimes it was frustrating asking for one thing and getting an answer about a different topic."

Outdated Information and Broken Links

"The majority of the information I had seemed outdated to me. Besides, links/URL provided were broken, and this situation worried me at times."

Lack of In-Depth Understanding

"I missed more in-depth answers from the chatbot and not simply definitions and links to find additional resources. I feel only the instructor can do this."

Limited Interaction and Follow-Up

"Few times I just received a link or a short answer to my question."

Challenges in Applying Knowledge

"Some of my questions couldn't be answered because they were about how to apply the knowledge from the course. I needed more instructions."

Decreased Critical Thinking Skills

"Reliance on chatbots for information can cause students to passively accept answers without questioning their validity or exploring alternative perspectives."

Lack of Emotional Support

"AI chatbots may not be able to provide the same level of emotional support and guidance as human teachers, impacting student well-being and mental health."

After synthesizing the negative feedback received, we can say that the students complained about their interaction with the chatbot because it didn't carry out in-depth learning and the human element was missing. They also acknowledged that the chatbot gave the same responses to different questions. The need for more instructions on how to apply the knowledge acquired from the course was also highlighted. Notwithstanding, students formed good views after interacting with the chatbot and fully appreciated the interaction approach. The vast majority recommended the integration of chatbots in other courses of their studies and more than half of the participants preferred the chatbot comparing to the interaction with the instructor. Some representative responses are presented below:

"The chatbot often misunderstood my questions, leading to irrelevant answers. Enhancing its ability to comprehend and respond accurately would make it more useful."

"I would appreciate if the chatbot could offer detailed explanations and step-by-step solutions, especially for complex topics like mathematics."

"Linking the chatbot with our LMS would allow it to access course materials, assignments, and grades, providing more personalized assistance."

"As a non-native English speaker, having the option to interact with the chatbot in my native language would enhance my learning experience."

"Incorporating voice recognition would make the chatbot more accessible, especially for students with disabilities or those who prefer auditory learning."

"It's crucial that the chatbot adheres to strict data privacy regulations to protect sensitive student information."

"Receiving immediate feedback on assignments from the chatbot would help me understand my mistakes and improve my performance."

"Allowing the chatbot to tailor learning paths based on individual progress and preferences would make learning more effective."

"Integrating features that recognize and respond to emotional cues could provide students with the necessary support during stressful periods."

"Ensuring that the chatbot's content is up-to-date and introducing new features based on user feedback would keep the tool relevant and effective."

DISCUSSION

This study examined the impact of chatbot integration on student learning within a rural South African university, using the UTAUT as a guiding framework. UTAUT posits that learners actively construct their own knowledge through experience, reflection, and interaction with their environment, rather than passively receiving information. The findings from this research highlight the ways in which chatbots can support constructivist learning principles, particularly in resource-constrained educational contexts.

The research results revealed that the chatbot was not merely used as a tool for receiving pre-packaged information, but rather as an interactive platform that encouraged students to ask questions, explore concepts, and reinforce their understanding through conversation-based learning. Many students reported using the chatbot to revisit lecture topics, clarify difficult material, and test their comprehension, reflecting active engagement with content. This aligns with constructivist ideals, where learning is most effective when students are participants in their own educational process, constructing meaning through dialogue and reflection. Also, in terms of students perceived expectancy, effort expectancy, trust, and social influences.

Quantitative studies consistently show that students perceive chatbots as useful tools for enhancing learning outcomes. For instance, a study involving 842 undergraduate students found that perceived relative advantages, compatibility, trialability, perceived usefulness, and trust were significant predictors of students' intention to use chatbots for academic purposes. Similarly, a study in Lesotho confirmed that students who recognized the benefits of chatbots expressed a strong intention to adopt them.

Ease of use is a critical factor in technology adoption. Quantitative analyses indicate a strong positive relationship between perceived ease of use and students' acceptance of chatbots. For example, a study in Malaysia reported a correlation value of 0.813 between perceived ease of use and students' acceptance, with a significance level of 0.000. The role of social influence in chatbot adoption appears to be context-dependent. In some studies, social influence was found to be statistically insignificant in predicting students' behavioral intention to use chatbots.

For instance, a study in Hong Kong indicated that social influence did not significantly affect students' intention to use ChatGPT for assessment support. Access to resources and support structures is essential for successful technology adoption. Studies indicate that facilitating conditions, such as reliable internet access and institutional support, significantly impact students' ability to use chatbots effectively. For example, a study in Zimbabwe highlighted the importance of institutional infrastructure in supporting the use of WhatsApp for lecture delivery during the COVID-19 lockdown. Trust in chatbot technology is a significant determinant of its adoption. A study in Hong Kong found that trust was the strongest determinant of students' acceptance of ChatGPT for assessment support. Trust influences students' willingness to rely on chatbots for academic purposes, especially in high-stakes contexts like assessments.

When compared to previous research such as (Schei et al., 2024), who explored chatbot use in urban universities and found that chatbots fostered collaborative and exploratory learning the results of this study resonate in several ways. Both studies underscore how chatbot interactions can promote cognitive engagement and curiosity. However, a notable difference lies in the level of peer-to-peer interaction. While (Schei et al., 2024) found chatbots to be effective in enhancing collaborative learning through group chatbot activities and discussion prompts, students in this rural university primarily used the chatbot individually, largely due to infrastructural limitations and less integrated learning systems. This suggests that while constructivist learning was achieved at an individual level, social constructivism where knowledge is co-constructed through interaction with others was less prominent due to contextual constraints.

Another contrast is evident in technological confidence and exposure (Naidoo, 2025; Soobramoney & Govender, 2025). In more digitally advanced environments, students entered the chatbot experience with higher baseline skills and expectations, whereas students in this rural context displayed gradual adaptation and learning of digital tools alongside their academic content. This dual learning process both of digital skills and academic knowledge adds a layer of complexity that is less evident in studies from urban or global North contexts.

Importantly, this research contributes to the existing literature by emphasizing the constructivist potential of chatbots in marginalized and under-resourced settings. While prior studies often focus on the novelty or efficiency of chatbots, this study highlights how they can democratize access to active learning, especially in contexts where human academic support is limited. The chatbot acted as a cognitive scaffold, allowing students to build knowledge independently, while also encouraging reflection, repetition, and gradual mastery hallmarks of effective constructivist learning environments.

CONCLUSIONS

This study explored the impact of chatbot technology on student learning at a rural university in South Africa, highlighting both the opportunities and challenges that emerge when digital innovations intersect with educational development in under-resourced contexts. The findings revealed that chatbots can play a crucial role in supplementing traditional teaching methods by offering real-time academic support, enhancing student engagement, and providing accessible learning resources beyond the constraints of time and location. These benefits were particularly evident in how students used chatbots to clarify course content, revise for assessments, and seek administrative guidance.

However, the study also identified significant challenges. Limited internet connectivity, uneven access to digital devices, and varying levels of digital literacy among students and staff posed barriers to effective chatbot use. Furthermore, while students appreciated the availability and responsiveness of the chatbot, some expressed concerns about its limitations in handling complex queries and offering personalized academic feedback. The success of chatbot integration, therefore, depends not only on the technological tool itself but also on the broader support ecosystem, including digital infrastructure, training, and curriculum alignment.

Finally, while chatbot implementation at the rural university demonstrated a positive impact on student learning, especially in promoting self-directed learning and reducing dependency on limited human resources, its full potential can only be realized through ongoing investment in infrastructure, inclusive digital literacy programs, and continuous

refinement of chatbot content to align with evolving academic needs. This study underscores the importance of context-specific solutions and stakeholder involvement in leveraging educational technologies for meaningful and equitable learning experiences in rural higher education.

CONFLICT OF INTEREST

The authors declare that there are no conflicts of interest regarding the publication of this paper.

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ARTIFICIAL INTELLIGENCE STATEMENT

No artificial intelligence tools were used in the preparation of this manuscript.

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EFFECTIVENESS OF USING MIND MAPS IN THE LEARNING PROCESS: TEACHERS' PERSPECTIVES AND STUDENTS' ASSESSMENTS

ЕФЕКТИВНІСТЬ ЗАСТОСУВАННЯ МЕНТАЛЬНИХ КАРТ В НАВЧАЛЬНОМУ ПРОЦЕСІ: ПОГЛЯД ВИКЛАДАЧІВ ТА ОЦІНКА СТУДЕНТІВ

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ABSTRACT

Purpose. The study aims to analyze the experience of integrating mind mapping into the "Medical Biology" course for first-year medical students. The rationale is driven by the need to overcome the barriers of "clip thinking" in Generation Z and to transform traditional note-taking methods into active visual structuring tools to manage the increasing volume of medical information and improve preparation for the KROK-1 (an exam in general scientific disciplines, which is taken by applicants for medical and pharmaceutical education after studying the main fundamental disciplines) licensing examination.

Methodology. A comprehensive study was conducted during the autumn semester of 2025 at Zaporizhzhia State Medical and Pharmaceutical University. The sample included 42 first-year medical students (31% of the specialty cohort). The educational intervention involved creating mind maps for key modules, including: "Molecular-cellular level of life organization", "Laws of heredity and variability", "Methods of studying human heredity. Hereditary diseases", using digital platforms (Canva, Miro, Coggle) or paper media. Data were collected through an anonymous Google Forms survey using a Likert scale and analyzed using descriptive statistics in Microsoft Excel.

Results. Most students (92.9%) had little to no prior experience with mind mapping. 92.9% chose digital tools over paper, with Canva (50%) being the most popular platform. 95.2% of respondents confirmed that mind maps significantly improved material structuring, and 83.3% reported a

Мета. Метою дослідження є аналіз досвіду інтеграції ментальних карт у курс «Медична біологія» для студентів першого курсу медичних спеціальностей. Актуальність роботи зумовлена необхідністю подолання обмежень кліпового мислення покоління Z і трансформації традиційних способів конспектування в інструменти активного візуального структурування знань для опрацювання дедалі більших обсягів медичної інформації та підвищення ефективності підготовки до ліцензійного інтегрованого іспиту «КРОК-1».

Методологія. Комплексне дослідження було проведено протягом осіннього семестру 2025 року в Запорізькому державному медико-фармацевтичному університеті. Вибірка складала 42 студента першого курсу спеціальності «Медицина» (31% від загальної кількості на курсі). Освітнє втручання передбачало створення ментальних карт до ключових змістовних модулів: «Молекулярно-клітинний рівень організації життя», «Закономірності спадковості і мінливості», «Методи вивчення спадковості людини. Спадкові хвороби», з використанням цифрових платформ (Canva, Miro, Coggle) або паперових носіїв. Дані збиралися за допомогою анонімного опитування в Google Forms із використанням шкали Лайкерта та аналізувалися методами описової статистики в Microsoft Excel.

Результати. Більшість студентів (92,9%) мали незначний попередній досвід роботи з ментальними картами або зовсім його не мали. У ході дослідження 92,9% респондентів надали перевагу цифровим інструментам, серед яких найпопулярнішою платформою стала Canva (50%). 95,2% опитаних підтвердили, що ментальні карти

better understanding of cause-and-effect relationships. 100% of students found the method beneficial for independent literature review. Key elements identified as most effective were "Keywords" (59.5%) and "Branches" (40.5%), while "Color" (9.5%) and "Central Image" (11.9%) were rated lower. Time investment for most students (54.8%) was 1–2 hours per map. 88.1% of participants rated mind mapping as more effective than traditional linear note taking.

Conclusions. Mind mapping is a highly effective didactic tool that promotes active knowledge of construction and self-regulated learning in medical education. The preference for keywords and hierarchical branches reflects a pragmatic approach to learning, specifically tailored for identifying diagnostic markers in medical tests. To optimize the method, multimedia instructions for various digital platforms should be provided. Students' high motivation and request for cross-disciplinary integration suggest that mind mapping should be formally incorporated into the medical curriculum as a tool for synthesizing complex biological data.

Keywords: concept maps, learning methods, medical biology, medical education, medical students, mind maps.

суттєво покращили структуру матеріалу, а 83,3% відзначили краще розуміння причинно-наслідкових зв'язків. 100% студентів визнали метод корисним для самостійної роботи з літературою. Ключовими елементами, визначеними як найбільш ефективні, стали «Ключові слова» (59,5%) та «Гілки» (40,5%), тоді як «Колір» (9,5%) та «Центральний образ» (11,9%) отримали нижчі оцінки. Часові витрати для більшості студентів (54,8%) склали 1–2 години на одну карту. 88,1% учасників оцінили ментальні карти як більш ефективні порівняно з традиційним лінійним конспектуванням.

Висновки. Ментальні карти є високоефективним дидактичним інструментом, що сприяє активному конструюванню знань та саморегульованому навчанню в медичній освіті. Перевага, надана «ключовим словам» та «ієрархічним гілкам», відображає прагматичний підхід до навчання, орієнтований на ідентифікацію діагностичних маркерів у медичних тестах. Для оптимізації методу слід забезпечити мультимедійний супровід для різних цифрових платформ. Висока мотивація студентів та запит на міждисциплінарну інтеграцію свідчать про доцільність офіційного включення ментальних карт у навчальний план як інструменту для синтезу складних біологічних даних.

Ключові слова: концептуальні карти, медична біологія, медична освіта, ментальні карти, методи навчання, студенти-медики.

INTRODUCTION

Modern medical education is undergoing transformation driven by the rapid growth of scientific information, technological progress, and changes in the cognitive profiles of students (Miguez-Pinto et al., 2025; Aljamal et al., 2025). The study of medical biology is the foundation of clinical thinking, but traditional teaching methods often prove insufficient for mastering complex molecular-genetic and cellular mechanisms (Kralova, 2017; Popovich & Aliyeva, 2024; Popovych & Aliyeva, 2025). Recent data show that classical note-taking is gradually losing its relevance, giving way to methods of visual structuring (Shuliak et al., 2022; Burlacu, 2025).

The relevance of this study is due to the phenomenon of 'clip thinking' characteristic of Generation Z, born between the mid-1990s and mid-2010s. This type of thinking is characterised by low concentration, difficulty reading long texts, rapid loss of focus, inability to deeply understand and generalise what has been read, and the dominance of visual perception over textual perception (Havrylenko et al., 2023; Sajadi et al., 2024; Abdel-Hamid et al., 2017).

For such learners, classical teaching methods become a barrier, while mind maps offer a non-linear approach that corresponds to the natural work of the brain through associative connections. At the empirical level, it has been proven that mental maps have a positive effect on the formation of subject competence, help to organize and systematize scientific information, group scientific data and thoughts, find new ideas,

plan work, assess its scope, and summarize scientific achievements in a certain field of research (Hyria, 2022).

British researcher Tony Buzan proposed the use of mind maps as a reflection of "radiant thinking". His theory is based on the fact that the brain works most effectively when we combine the logic of the left hemisphere with the creativity of the right. The map model resembles a "radiant": in the center is the main idea, and from it, like rays, associations diverge. This approach helps not just to mechanically record data, but to create your own network of symbols, which makes the learning process creative and significantly improves memory (Romanovskyi et al., 2018).

The **aim** of our work was to analyse the experience of using mind maps in medical biology classes during the semester and to evaluate their impact on learning effectiveness based on a student survey.

METHODOLOGY

A comprehensive approach combining theoretical and empirical research methods was used in the course of the work. Over the course of one semester (September-December 2025), tasks for constructing mind maps based on content modules were integrated into the educational process: Molecular-cellular level of life organization,' Patterns of heredity and variability,' "Methods for studying human heredity. Hereditary Diseases." In the first class, students received methodological recommendations for creating mind maps.

They were offered a choice of digital tools: Coogle, XMind, Canva, Xmind, Miro; or paper media. Students created maps during classroom sessions to systematize new material, as well as during independent study to summarize the topic. The work was carried out in small groups, but some students worked alone.

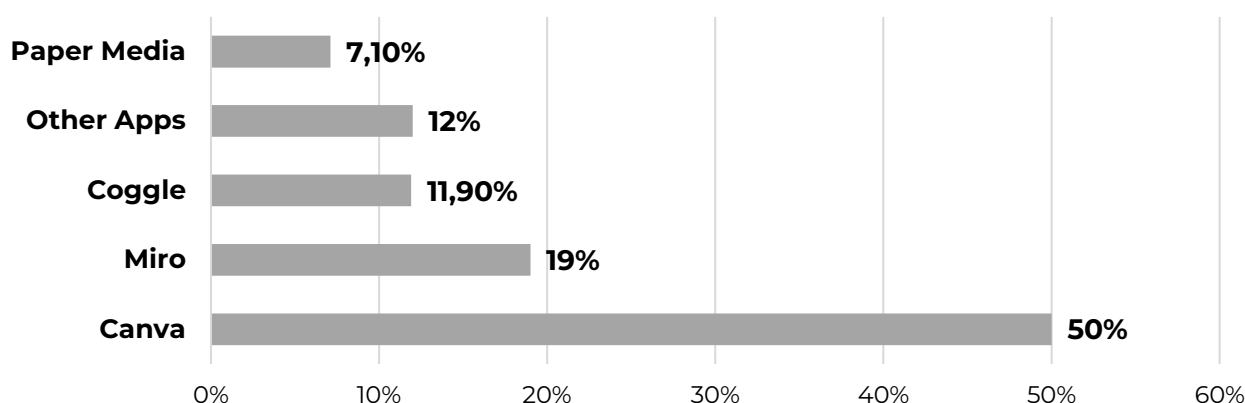
During the sessions, students gave presentations, and the lecturer analyzed maps focusing on the correctness of the logical connections. To assess the effectiveness of the method, an anonymous survey was conducted at the end of the semester. The data obtained was processed using mathematical statistics methods with Microsoft Excel software.

RESULTS

Respondents who voluntarily agreed to participate in the survey were guaranteed complete anonymity. The survey was conducted using a Google form. Forty-two first-year students majoring in medicine at Zaporizhzhia Medical and Pharmaceutical University participated in the survey, representing 31% of the total number of students in this major.

According to the survey results, half of the respondents indicated that they had no previous experience in using mind maps, 42.9% used them occasionally, and only 7.1% of students used them regularly.

To create mind maps, students were offered a choice of digital platforms for online work, paper media, or digital platforms for classroom work. Only 7.1% of respondents chose paper media for their work, while the rest of the students used applications. The most popular platforms are indicated in Figure 1.

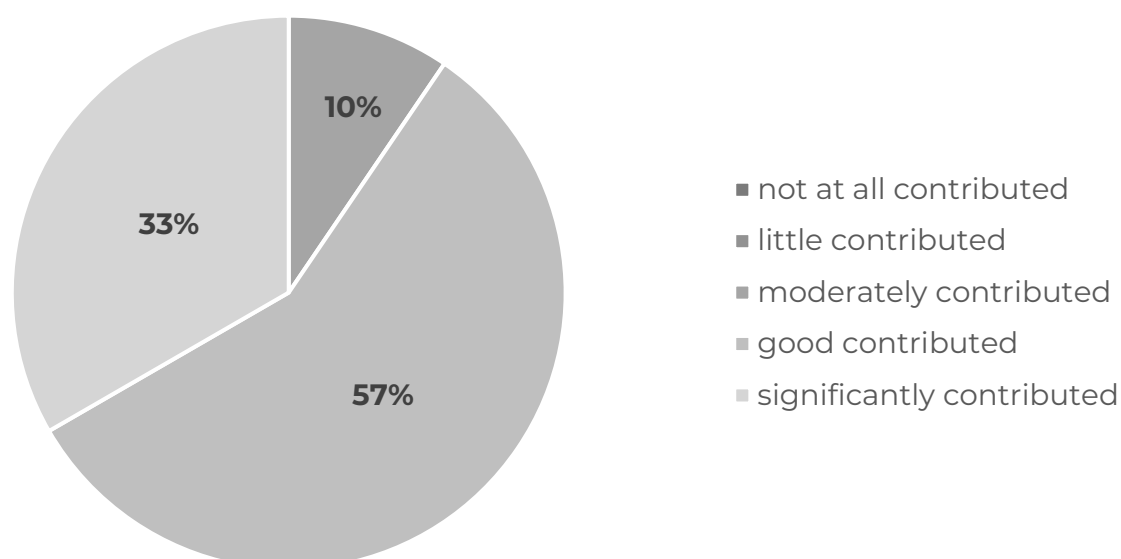
Figure 1*Student platform choices for Mind Mapping (%)*

The main focus of our research was on the feasibility of using mind maps in class. Therefore, important question was to determine how much mind maps helped students structure the material of the topic when preparing for class. For the assessment, we used Likert's scale, where respondents rated their degree of agreement or disagreement on an ordered scale (from 'Did not help at all' to 'Helped significantly').

Almost unanimously (95.2%), students agreed that mind maps helped them structure academic material of the topics studied. 35.7% responded that the maps helped 'significantly,' and 35.7% responded that they helped 'well.' Another 4.8% felt that the maps were 'moderately' helpful.

When asked whether creating a mental map helped them better understand the cause-and-effect relationships between processes and concepts, 83.3% answered 'yes,' 14.3% noted partial benefit, and only 2.4% (n=1) did not find it helpful.

The respondents' experience shows that the use of mind maps greatly facilitates the process of studying literature without outside help. The respondents' answers are shown in Figure 2.

Figure 2*Subjective assessment by respondents of the effectiveness of working with information sources using mind maps*

90.5% of respondents noted that creating mind maps was a motivational and creative task. 7.1% partially felt this function, and 2.4% (n=1) did not see any benefit.

We wanted to understand which elements of mind maps are key to understanding the topic. The survey results are shown in Table 1. Only 11.9% of respondents noted the 'central image' as a key element of a mind map. However, it is important for focusing attention and triggering associative thinking, and is the focal point of the map. We believe that this indicator is low because the central image is often a picture. Meanwhile, 38.1% of respondents voted for the importance of the 'Image'. Images are indeed an important element of maps, as we process visual information faster and remember it more quickly.

For each topic, we gave students a table with KROK tests, where they had to identify 'Key Words' and incorporate them into the mind map. This is necessary for preparing for the KROK and for associative memorisation, which makes the map easy and flexible to read. 59.5% of respondents voted for the importance of 'Keywords'. Such element as 'Colour' divides information into logical zones, which helps to structure the map in memory.

In our survey, 9.5% of students noted the importance of this element. We believe that this indicator is low because one topic contains many blocks that are not simplified by colouring them in different colours and may even interfere. Therefore, the use of colour may be more appropriate if the topic has a small number of blocks. 'Branches' and 'Arrows' are important details of mind maps. They were voted for by 40.5% and 28.5% of respondents, respectively. Branches represent key sections of a topic and provide detailed information. Arrows show the non-linearity of interactions between concepts (Table 1).

Table1

The most useful elements of a mind map according to students

Mind map elements	Number of responses	Percentage of total
Central Image	5	11,9%
Keywords	25	59,5%
Image	16	38,1%
Branches	17	40,5%
Arrows	12	28,5%
Color	4	9,5%

During the classes, students worked on the topic in groups and then created mind maps. Then, each team presented their map to the whole class. After the presentation, students could ask the presenters questions or clarify the information provided. According to the survey, 90.5% of respondents said that they understood the topic better, and 9.5% said that it was partially useful.

It was also key for us to determine the effectiveness of mind maps compared to traditional methods, in particular, note-taking. 28.6% of respondents noted the significant effectiveness of maps, 59.5% recognised their overall effectiveness, and 11.9% noted moderate effectiveness.

To obtain feedback, students' experience in working with mind maps was analyzed. In particular, the time spent on creating mind maps, the cognitive accessibility and practical value of the instructions provided, the problems that arose during the work, as well as the students' subjective suggestions for optimizing the use of this method in

further education were analyzed. Most respondents, namely 54.8%, said that it took them 1-2 hours to create a mind map; 26.2% said 2-3 hours; 16.7% said more than 3 hours; and 2.4% said less than 1 hour.

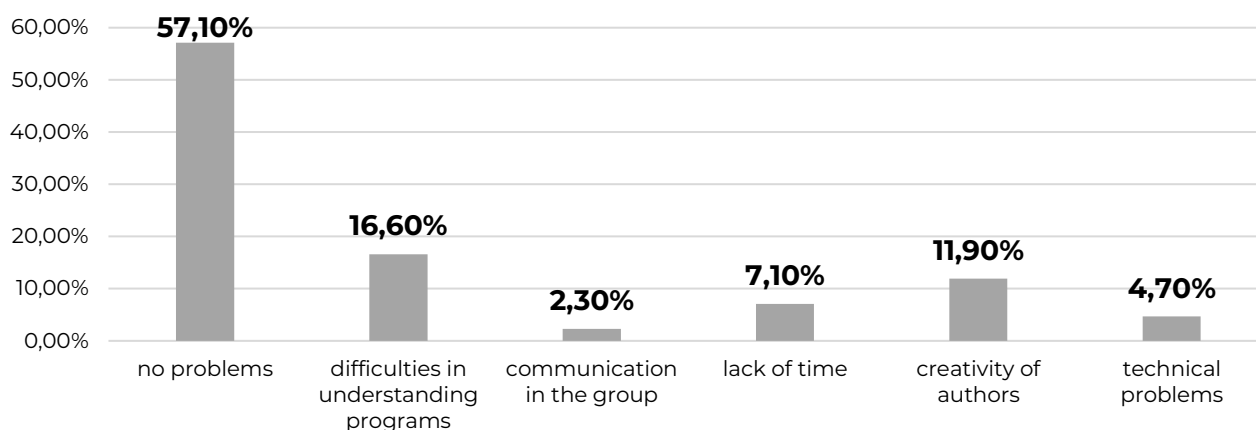
Regarding the instructions provided, on a scale of 1 to 5, where 1 is 'Not clear at all' and 5 is 'Completely clear,' 57.1% chose '5,' 35.7% chose '4,' and 7.1% chose '3.'

We believe this is due to the fact that the video instruction we provided was only for work on the Miro platform. Students chose other platforms and took a long time to understand their use. work.

The majority of respondents (57.1%) said they had no problems working with mind maps. 11.9% mentioned the creativity of the authors, which slowed down the process; 16.6% noted that they had certain difficulties in understanding the programmes; 7.1% mentioned lack of time; 4.7% mentioned technical problems, in particular problems with lighting; 2.3% mentioned problems with communication within the group (Fig. 3).

Figure 3

Difficulties encountered by students when creating a mind map



Among the most common suggestions for improving the use of mind maps, most students said they had no suggestions – 57.1%. Among the leading suggestions were: 'Use maps not only in medical biology, but also in other subjects' – 7.1%, 'Use them more often' – 24.4%, 'Use mind maps not only for preparation, but also for summarising and reviewing material' – 7.1%, 'Integrate maps into the learning process as an auxiliary tool' – 7.1%.

DISCUSSION

To complete the assignment, we offered students a choice of paper or digital platforms: Coogle, XMind, the cross-platform service Canva, or the interactive whiteboard Miro (Zuziak & Rabetska, 2025). Most students chose digital platforms over traditional paper media. Zainuddin et al. note that digital platforms allow students to focus on the content of learning and minimise the time spent on technical design, thus reducing cognitive load (Zainal Abidin et al., 2025). Suryani et al. (2024) confirm their colleagues' opinion, noting that the use of digital environments contributes to the development of students' digital competence and their greater involvement in the content of the work.

In our opinion, another reason for using digital platforms may be the convenient dynamic editing of material and the high level of digital literacy of today's youth. The choice of Canva as the preferred platform can be explained by its intuitive interface and the availability of ready-made templates, which also minimises cognitive load and the technical part of the work. Canva has an intuitive interface with drag-and-drop features

and professional templates, making it an accessible platform for high-quality design even without special skills (Pedroso et al., 2023). The results of a study by Anandha, R. P., et al. show that Canva improves engagement, comprehension, and cognitive development during lessons, leading to positive learning outcomes and serving as a digital tool for effective note-taking (Jamaludin & Sedek, 2024).

When working on the material, students noted that 'Key words' (59.5%) became a priority, which we associate with the specifics of preparing for the KROK exam. Students focus on terminological markers that are critical for solving test tasks. We did not find any information in the literature about the role of keywords in the training of medical students, but we assume that students view the mind map not as an illustration, but as a navigation scheme, where keywords serve as markers for quick identification of correct answers in KROK tests. The low importance rating of colour (9.5%) and the central image (11.9%) may indicate a purely pragmatic approach to learning on the part of future medical professionals.

We assume that the large amount of medical information forces students to perceive colour not as a stimulus for orientation, but as additional visual noise, especially in complex multi-component topics. Students identify the important role of 'Branches' and 'Arrows' in structuring and processing material. This is natural, as these components of the maps reflect the logical structure of the topic. However, when comparing these two concepts, the relatively low percentage of arrow usage (28.5%) compared to branches (40.5%) indicates that respondents prefer a hierarchical structuring of knowledge (Novak & Cañas, 2008).

A positive assessment in structuring the material and improving understanding of cause-and-effect relationships may indicate that the student is moving from passive reading to active use of knowledge. Recording what has been read in the form of a diagram with key words and their interrelationships highlighted forces the student to think and analyse the material (Kravets et al., 2025). It is particularly significant that 100% of respondents recognised the usefulness of maps in independent work with literature. This indicates the development of self-regulated learning skills, which are critical for the medical profession. In other words, students set specific goals for themselves, control the learning process, and adapt strategies to achieve better results (White et al., 2013).

The advantage of mind maps over traditional note-taking for 88.1% of respondents confirms the conclusions of Farrand et al. that non-linear visualisation is better suited to the memory architecture of future doctors. Their research reports that mind maps improve the actual memorisation of medical information by 10% compared to traditional learning methods (Farrand et al., 2002).

CONCLUSIONS

1. The introduction of mind maps into the medical biology teaching process has demonstrated high didactic value: 95.2% of students confirmed an improvement in the structuring of material, and 83.3% confirmed a deeper understanding of cause-and-effect relationships. This confirms that a non-linear form of presenting information is relevant for overcoming the barriers of 'clip thinking' among modern students.
2. The mind mapping technique has a significant advantage over traditional note-taking for 88.1% of respondents.

3. Digital platforms (92.9%) dominate over paper media, with Canva (50%) leading the way. This is due to the high level of digital literacy among students and the desire to minimise external cognitive load through intuitive interfaces and ready-made templates.
4. Analysis of the key elements of the cards revealed a specific 'medical' visualization profile: priority of keywords (59.5%) and branches (40.5%). This choice is due to the focus on preparing for the KROK exam, where keywords serve as terminological markers for quick identification of correct answers.
5. Despite the time spent (1–2 hours for 54.8% of respondents), students demonstrate high motivation for the method. The high demand for the integration of mind maps into the study of other disciplines emphasises the need to create unified methodological recommendations and multimedia instructions for various digital platforms in order to optimise the independent work of future specialists.

CONFLICT OF INTEREST

The authors declare that there are no conflicts of interest regarding the publication of this paper.

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ARTIFICIAL INTELLIGENCE STATEMENT

No artificial intelligence tools were used in the preparation of this manuscript.

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REFRAMING ACADEMIC FREEDOM IN TURBULENT POLITICAL CONTEXTS: AFRICAN SCHOLARS' PERSPECTIVES FROM SOUTH AFRICA

ПЕРЕОСМИСЛЕННЯ АКАДЕМІЧНОЇ СВОБОДИ В ТУРБУЛЕНТНИХ ПОЛІТИЧНИХ КОНТЕКСТАХ: ПОГЛЯДИ АФРИКАНСЬКИХ НАУКОВЦІВ З ПІВДЕННОЇ АФРИКИ

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ABSTRACT

Purpose. This study examines how turbulent political contexts shape academic freedom in selected African countries, as interpreted by foreign national academics from Africa working in South African higher education institutions. Framed by conflict theory and neo-institutionalism, the article investigates how

Мета. Це дослідження розглядає, як турбулентний політичний контекст формує академічну свободу в окремих африканських країнах, як це інтерпретують іноземні науковці з Африки, які працюють у закладах вищої освіти Південної Африки. Спираючись на теорію конфлікту та неоінституціоналізм, стаття досліджує, як

Reframing academic freedom in turbulent political contexts: African scholars' perspectives from South Africa
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governance instability, political interference, and executive dominance affect institutional autonomy and scholarly practice.

Methodology. *A qualitative interpretivist design was used. Semi-structured online interviews were conducted with eight academics from Nigeria, Zimbabwe, Uganda, and the Democratic Republic of Congo, employed across public and private higher education institutions in South Africa. The data were analysed through thematic analysis combining inductive and deductive coding processes.*

Results. *Participants described academic freedom as encompassing freedom of expression, teaching, research, access to information, and academic mobility. The findings show that academic freedom is weakened by politicised appointments, compromised institutional autonomy, constrained teaching and research, surveillance, funding pressures, and weak constitutional protection. Participants further noted that universities may be reduced to instruments of state legitimisation through curriculum control and the suppression of critical discourse.*

Conclusions. *Academic freedom emerges not simply as an institutional norm but as an indicator of democratic institutional maturity. Safeguarding it requires stronger constitutional protection, transparent governance, depoliticised leadership, and educational cultures that value critical inquiry, accountability, and public dialogue. Sustainable academic freedom depends on a combination of enforceable legal guarantees, institutional integrity, and a broader democratic culture that supports independent scholarly thought.*

Keywords: *academic freedom, African foreign national academics, conflict theory, neo-institutionalism, turbulent political contexts.*

нестабільність управління, політичне втручання та домінування виконавчої влади впливають на інституційну автономію та наукову практику

Методологія. *Було використано якісний інтерпретативний дизайн. Проведено напівструктуровані онлайн-інтерв'ю з вісьмома науковцями з Нігерії, Зімбабве, Уганди та Демократичної Республіки Конго, які працюють у державних і приватних закладах вищої освіти Південної Африки. Дані проаналізовано за допомогою тематичного аналізу із поєднанням індуктивного та дедуктивного кодування.*

Результати. *Учасники описали академічну свободу як таку, що охоплює свободу вираження поглядів, викладання, досліджень, доступу до інформації та академічної мобільності. Результати показують, що академічна свобода послаблюється політизованими призначеннями, скомпрометованою інституційною автономією, обмеженим викладанням та дослідженнями, наглядом, тиском на фінансування та слабким конституційним захистом. Учасники також зазначили, що університети можуть перетворюватися на інструменти легітимації державної влади через контроль над навчальними програмами та обмеження критичного дискурсу.*

Висновки. *Академічна свобода постає не просто як інституційна норма, а як показник демократичної інституційної зрілості. Для її захисту потрібен сильніший конституційний захист, прозоре управління, деполітизоване лідерство та освітня культура, яка цінує критичне дослідження, підзвітність та публічний діалог. Сталий захист академічної свободи залежить від поєднання правових гарантій, інституційної доброчесності та широкої демократичної культури, що підтримує незалежне наукове мислення.*

Ключові слова: *академічна свобода, африканські іноземні науковці, теорія конфлікту, неоінституціоналізм, турбулентний політичний контекст.*

INTRODUCTION

Academic freedom is fundamental to knowledge production, critical inquiry, and the public role of universities. UNESCO's Recommendation concerning the Status of Higher-Education Teaching Personnel defines it as the freedom to teach, research, publish, participate in institutional life, and express scholarly views without fear of institutional sanction or political reprisal (UNESCO, 1997). In democratic settings, this freedom enables universities to fulfil their public mission: to test ideas, generate evidence, challenge orthodoxy, and contribute to civic debate. It also underpins institutional

autonomy, as universities cannot exercise independent judgement if their scholars work under conditions of fear or anticipatory compliance (Altbach, 2007a, 2007b).

Across parts of Africa, however, academic freedom faces mounting pressure. Contested elections, executive overreach, economic crisis, a weakened rule of law, and the politicisation of public institutions have intensified constraints on higher education (Kigotho, 2023; Montana, 2023). Turbulent political contexts not only produce visible disruption through protest, unrest, or campus closures; they also generate quieter institutional effects, including compromised leadership appointments, budgetary dependence, pressure on the curriculum, and informal expectations of political loyalty (Appiagyei-Atua et al., 2016; Kitale, 2020; Montana, 2023). Under such conditions, universities may continue to project the language of autonomy while losing much of their substantive independence.

The continental literature increasingly links academic freedom to democratic quality, constitutional protection, and the integrity of governance systems (Appiagyei-Atua et al., 2016; Kratou & Laakso, 2021; Shaheed, 2024). However, much of this literature remains oriented towards indices, legal provisions, or single-country studies. Less attention has been paid to how African academics themselves interpret the relationship between political turbulence and academic freedom, particularly when they reflect comparatively across national contexts. African foreign national academics working in South Africa occupy a distinctive interpretive position, as they can draw on the experience, memory, and observation of their countries of origin while working within a higher education system where academic freedom is formally recognised (UNESCO, 1997). Their accounts reveal how academic freedom is lived, negotiated, or diminished under different political conditions.

The South African location of the study is also analytically useful. South Africa's constitutional order offers stronger formal recognition of rights than in many other settings on the continent. However, it remains part of the same regional political and higher-education landscape. Participants, therefore, speak neither from complete detachment nor from simple proximity. Their reflections are shaped by comparison, professional relocation, and ongoing engagement with home-country politics. This position enables them to illuminate both contrasts and continuities in the governance of higher education across Africa.

This article, therefore, **aims** to investigate how African foreign national academics in South African higher education institutions understand the effects of turbulent political contexts on academic freedom in their countries of origin. The article makes three contributions. First, it strengthens continental debates about the relationship between governance instability and institutional autonomy (Appiagyei-Atua et al., 2016; Kratou & Laakso, 2021). Second, it draws on conflict theory and neo-institutionalism to explain how struggles over power intersect with organisational adaptation in higher education (Bourdieu, 1986; Savage & Finn, 1999). Third, it moves the discussion of academic freedom beyond abstract principles by grounding it in scholars' lived perceptions, whose careers and mobility have been shaped by unequal political environments.

INTEGRATED THEORETICAL FRAMEWORK AND LITERATURE REVIEW

The relationship between political governance and academic freedom is well established in higher education scholarship. Academic freedom does not exist outside the state; rather, it is embedded within wider political cultures, public institutions, and constitutional arrangements (Altbach, 2007a; UNESCO, 1997). Where democratic institutions are weak and executive power is concentrated, universities become more vulnerable to direct and indirect interference, and the erosion of academic freedom

becomes part of a broader crisis of governance and civic space (Kratou & Laakso, 2021; Shaheed, 2024).

Conflict theory offers a critical lens for understanding these dynamics. Rather than treating universities as neutral sites of truth-seeking, it situates them within broader struggles over power, legitimacy, ideology, and symbolic capital (Bourdieu, 1986). In politically turbulent contexts, universities may become sites where ruling elites regulate dissent, shape national narratives, and subordinate scholarship to the interests of power (Altbach, 2007a; Appiagyei-Atua et al., 2016; Shaheed, 2024).

Neo-institutionalism complements this analysis by explaining how universities adapt to external pressures to secure legitimacy, stability, and resources. Where funding, regulatory approval, and leadership appointments are tied to the state, institutions may align with political expectations and, over time, normalise interference as part of ordinary governance (Appiagyei-Atua et al., 2016; Savage & Finn, 1999). This perspective helps explain why universities may reproduce compromised autonomy internally, even when external coercion is not constant.

Historical and contemporary work on academic freedom also warns that the language of autonomy can obscure unequal institutional realities. Universities may present themselves as autonomous while operating within systems of dependency, political patronage, or managerial control (Altbach, 2007a; Wolhuter & Langa, 2021). In such settings, academic freedom is not removed by a single act of censorship; it is gradually eroded by bureaucratic routines, leadership capture, and the expectation that scholars avoid politically inconvenient questions.

This literature also helps explain why academic freedom is often curtailed in politically sensitive disciplines such as governance, economics, law, history, and the social sciences. In these fields, critical work is more likely to challenge state narratives, expose inequality, or question dominant interests, leaving scholars vulnerable to surveillance, marginalisation, or informal pressure (Bourdieu, 1986; Shaheed, 2024). The issue is therefore not only whether academics can speak, but whether institutional conditions allow them to pursue inconvenient knowledge without sanction.

African scholarship reinforces these concerns. Appiagyei-Atua et al. argue that many higher education systems on the continent continue to exhibit weak institutional autonomy, limited self-governance, and insufficient protection against state interference (Appiagyei-Atua et al., 2016). Omodan (2023) similarly shows that social unrest and institutional responses in African universities are inseparable from broader structural conditions, including weak governance and contested authority.

A major issue in the literature concerns the distinction between rights that are broadly recognised and those that are specifically enforceable. Many constitutions protect freedom of expression or the right to education, yet fewer provide explicit, enforceable protection for academic freedom and institutional autonomy (Appiagyei-Atua et al., 2016; UNESCO, 1997). Shaheed (2024) argues that academic freedom should be recognised as a distinct human right because it safeguards forms of intellectual labour that are especially vulnerable to political interference.

Another important strand in the literature concerns the relationship between academic freedom and the public sphere. Academic freedom matters not only because it protects individual scholars but also because it sustains the production of knowledge on which democratic debate depends (Altbach, 2007b; Kratou & Laakso, 2021). When academic

freedom contracts, the consequences are institutional and societal: public discourse becomes poorer, policy is less open to scrutiny, and universities lose part of their civic function.

The literature also shows that politicised leadership and governance arrangements lie at the heart of the problem of academic freedom. When state actors influence the appointment of vice-chancellors, rectors, chancellors, or councils, institutional autonomy is weakened at its source (Appiagyei-Atua et al., 2016; Omodan, 2023). Governance arrangements are therefore not administratively neutral; they determine whether universities function as spaces of critical inquiry or as extensions of executive power.

The literature further suggests that legal protection alone is insufficient unless accompanied by governance cultures that respect it. Constitutions may mention rights, yet universities continue to operate through patronage, fear, and anticipatory compliance (Hawi, 2010; Shaheed, 2024). Sustainable academic freedom, therefore, depends on legal protection, institutional design, leadership integrity, and a wider political culture that tolerates critique.

Although international monitoring reports document attacks on higher education across regions, they cannot fully capture how academics interpret the lived consequences of these pressures. This is why the perspectives of African foreign national academics in South Africa are particularly valuable. Their comparative position enables them to reflect on home-country conditions from within another African higher education system, revealing how academic freedom is experienced across unequal political settings (Scholars at Risk, 2022; Kratou & Laakso, 2021).

METHODOLOGY

The following research questions guided this study:

Main research question: How do African foreign national academics working in South African higher education institutions interpret the effects of turbulent political contexts on academic freedom in their countries of origin?

Sub-research questions

1. How do participants conceptualise academic freedom in relation to political turbulence in their countries of origin?
2. In what ways do governance instability, political interference, and executive dominance affect institutional autonomy and scholarly practice?
3. How do participants describe the effects of turbulent political contexts on teaching, research, and critical expression in higher education?
4. What constitutional, governance, and institutional changes do participants believe are necessary to strengthen academic freedom?

This study adopted a qualitative, interpretivist approach to understand how academics make sense of academic freedom in politically turbulent conditions, rather than to measure it numerically. A qualitative design was appropriate for examining the meanings participants attached to governance instability, political interference, and institutional autonomy in their countries of origin (Merriam, 1998; Jackson et al., 2007; Braun & Clarke, 2013).

The interpretivist paradigm was appropriate because the study examined meaning, context, and lived experience. Participants' accounts were treated as situated interpretations of broader institutional realities rather than as isolated opinions. This orientation aligns with research that regards interpretivism as suitable for

understanding social phenomena through participants' experiences and the meanings they construct (Kivunja & Kuyini, 2017; Moon & Blackman, 2017).

Purposive sampling was used to select eight African foreign national academics employed in South African public and private higher education institutions. Participants were drawn from Nigeria, Zimbabwe, Uganda, and the Democratic Republic of Congo. They were selected for their particularly relevant comparative position: they worked within South African higher education while also reflecting on the political and institutional conditions affecting academic life in their countries of origin.

The interview-based design was particularly appropriate because the study sought not only to catalogue incidents but also to understand how scholars linked political conditions to university life. Semi-structured interviews allowed participants to define key concepts in their own terms, provide illustrative examples, and move between personal experience and broader national interpretation. This flexibility was important given the study's focus on politically sensitive issues, including state interference, authoritarian governance, and the risks of speaking critically about higher education systems (Merriam, 1998).

Data were collected through semi-structured online interviews conducted via Microsoft Teams. The interview schedule drew on scholarship on academic freedom, institutional autonomy, political interference, and higher education governance, as well as the 1997 UNESCO Recommendation concerning the Status of Higher-Education Teaching Personnel (UNESCO, 1997; Savage & Finn, 1999). The interview-based design was particularly appropriate because the study sought not only to catalogue incidents but also to understand how scholars linked political conditions to university life. Semi-structured interviews allowed participants to define key concepts in their own terms, provide illustrative examples, and move between personal experience and broader national interpretation. This flexibility was important given the study's focus on politically sensitive issues, including state interference, authoritarian governance, and the risks of speaking critically about higher education systems (Merriam, 1998). Interviews enabled probing into politically sensitive experiences while remaining aligned with the research questions.

The data were analysed using thematic analysis. Coding combined inductive and deductive processes: themes were allowed to emerge from participants' accounts and were also interpreted in relation to the research questions and the article's theoretical framing. This combined approach is well established in qualitative research and is particularly useful when analysis aims to remain grounded in data while engaging with broader concepts (Braun & Clarke, 2013; Clarke & Braun, 2013).

The researchers were attentive to ethical concerns throughout the study, particularly given the sensitivity of discussing political turbulence, governance failure, and academic freedom. Care was taken to minimise participant burden and to avoid any coercion or undue pressure to participate. Potential participants received an information sheet and consent form by email, which explained the study's purpose, the voluntary nature of participation, and the ethical safeguards in place.

Participants were informed that they could decline to participate or withdraw at any time without penalty. Confidentiality was maintained by anonymising participants' identities in transcripts and reports. Because the study involved interviews, the researchers could identify participants; therefore, the study ensured confidentiality rather than anonymity. Data were handled securely, and identifying details were removed from the findings report.

The study was limited to African foreign national academics working in South African higher education institutions, originally from four selected African countries: Nigeria, Zimbabwe, Uganda, and the Democratic Republic of Congo. The study did not aim to provide a comprehensive account of academic freedom across the entire African continent, nor did it seek to compare all African higher education systems. Instead, it focused on the interpretive accounts of a small group of academics whose experiences and reflections offered insight into the relationship between political turbulence and academic freedom.

FINDINGS

Analysis generated four interrelated themes: conceptualising academic freedom amid political turbulence; governance instability and the erosion of institutional autonomy; political interference and constrained scholarly practice; and constitutional fragility and the struggle for sustainable academic freedom. Together, these themes show that academic freedom was experienced not as an abstract entitlement but as a fragile condition shaped by the quality of governance, political power, and the institutional climate of higher education.

First, participants defined turbulent political contexts as settings characterised by poor governance, authoritarianism, contested elections, conflict, and socio-economic instability. P2 linked unrest in Nigeria to “bad governance” and “political interference,” noting that a current protest had already led to university closures. P5 described turbulence as an overlap of electoral contestation, conflict, and socio-economic crisis, while P3 argued that “authoritarian governance by the government leads to civil unrest.” These responses indicate that participants did not treat turbulence as a temporary disruption. Rather, they framed it as a structural condition rooted in unequal power, weak accountability, and contested legitimacy.

Within this broader context, academic freedom was defined expansively. P8 described it as “the ability to express your views without getting unnecessary and unwarranted feedback,” while P4 referred to the freedom to teach and publish “without fear of any reprisal.” P6 emphasised access to information as a condition of research, and P1 linked academic freedom to the ability to study or work without being compelled to relocate. Participants therefore understood academic freedom as encompassing expression, teaching, research, epistemic access, and mobility. This broader framing is important because it links academic freedom to the material and political conditions that enable scholars to remain rooted in their own contexts.

Second, participants viewed governance instability as central to the erosion of institutional autonomy. Universities were described as vulnerable to top-down policymaking, corruption, politically influenced appointments, and executive control over leadership. P3 criticised the imposition of educational policy “without adequate consultation with the student, university, or society” and described collusion between governments and vice-chancellors over inflated financial decisions. P5 noted that ministries may influence senior managerial and academic appointments, while P7 stated bluntly that becoming a chancellor depends on presidential approval and support for the ruling party. The findings therefore suggest that institutional autonomy is weakened not only by formal state control but also by patronage, compromised governance, and captured leadership structures.

Third, participants reported that political interference directly constrains scholarly practice. P2 stated that such interference limits “the freedom of academics in terms of the

work that they can do,” while P6 linked it to restrictions on teaching and research. P5 cited funding constraints and warnings against investigating certain topics. P1 offered the most striking example, describing academic appointments as “very, very political” and noting the deployment of students in lecture halls to monitor discussions and teaching. P3 argued that the university can become “an extension of the government” through curricula designed to promote preferred state narratives. At the same time, P8 suggested that research in the social sciences and economics often fails to address root causes objectively because critical thinking is constrained. These accounts indicate that political interference operates materially through funding, symbolically through surveillance, and intellectually through control of the curriculum and research.

Fourth, participants viewed sustainable academic freedom as dependent on stronger constitutional and democratic conditions. P2 argued that constitutions should not be changed “on a whim” to suit presidential preference, stressing the need for the rule of law and constitutional respect. P1 emphasised that the academic community must retain sufficient autonomy to shape public discourse and contribute to society. Other participants extended the argument beyond constitutional reform alone. P4 called for public awareness campaigns on academic freedom; P3 emphasised leadership development; P7 argued for community engagement and open channels through which people can “speak the truth to power”; and P6 and P8 linked future academic freedom to what universities teach through the curriculum and pedagogy. The data therefore suggest that sustainable academic freedom depends on a combination of legal protection, institutional integrity, public culture, and democratic education.

While the themes are analytically distinct, participants’ accounts often moved across them. Comments about politicised appointments, for example, were rarely about governance structures alone; they were also about what such structures meant for curriculum choices, academic speech, and research possibilities. Likewise, constitutional reform was not discussed in a narrow legal sense alone, but in connection with leadership ethics, public awareness, and the cultivation of democratic habits. This overlap suggests that participants experienced academic freedom as an ecosystem rather than as a single right that can be protected in isolation.

The findings also reveal that participants repeatedly invoked the language of fragility, whether directly or indirectly. Universities were portrayed as vulnerable to capture, scholarship as vulnerable to pressure, and constitutions as vulnerable to manipulation. This recurring emphasis indicates that the problem is not only that rights are occasionally violated, but that the broader conditions for intellectual independence are unstable. Academic freedom was therefore narrated as contingent, uneven, and often dependent on the disposition of political actors rather than on secure institutional guarantees.

Across the themes, a common pattern emerges. Political turbulence was consistently associated with weakened institutional autonomy, constrained scholarship, and fragile constitutional protection. Academic freedom was therefore interpreted as reflecting broader democratic conditions rather than as a self-contained matter of the university.

DISCUSSION

The findings confirm that academic freedom in selected African contexts cannot be understood in isolation from broader patterns of political turbulence, governance instability, and executive interference. Participants linked unrest, authoritarian tendencies, electoral contestation, and socio-economic crisis to failures in political leadership and weak institutional accountability (Naidoo, 2025). This interpretation

aligns with scholarship indicating that instability in African states is driven less by diversity itself than by fragile institutions, weak governance, and ineffective political management (Elbadawi & Sambanis, 2000; Montana, 2023).

Participants' definitions of academic freedom also broaden the literature on academic freedom (Kotsokoane, Seeletse, 2025). Their accounts align with classic formulations that emphasise freedom of inquiry, teaching, research, and publication without fear of reprisal (Andreescu, 2013; Van Alstyne, 1972, as cited in Andreescu, 2013). At the same time, the findings suggest that academic freedom in turbulent contexts also includes the ability to remain academically rooted in one's own society rather than being displaced by repression or instability. In this respect, the study extends arguments that academic freedom shapes not only scholarship but also the conditions under which scholars can meaningfully participate in public life (Hawi, 2010).

One of the most striking implications of the findings is that academic freedom appears as both a condition of scholarship and of belonging. Participants repeatedly linked freedom in teaching and research to the freedom to remain, contribute, and speak from within their home contexts. This insight is significant because much of the literature treats academic freedom as an institutional or legal entitlement rather than as an issue entangled with mobility, displacement, and professional location (Shaheed, 2024).

The findings on governance instability reinforce Altbach's critique of managerialism, but they point more specifically to political managerialism. Participants described appointments, policy decisions, and institutional leadership as shaped by ministerial influence, presidential preferences, patronage, and corruption. This suggests that universities in these contexts are not only bureaucratised but also politically managed in ways that undermine institutional autonomy at its core (Altbach, 2007a; Appiagyei-Atua et al., 2016).

Conflict theory helps illuminate why these findings matter. Participants' accounts suggest that universities in turbulent political settings become contested spaces where ruling elites seek to regulate dissent, shape intellectual agendas, and define legitimate knowledge. The findings on surveillance, politically inflected curricula, and constraints on critical inquiry are consistent with a conflict-theoretical view of the university as embedded in wider struggles over power and symbolic control (Bourdieu, 1986; Shaheed, 2024).

The findings are equally consistent with neo-institutionalism. Participants described institutions adapting to political pressure by normalising compromised autonomy, reproducing state-approved narratives, or accepting interference as ordinary. This is important because it shows that academic freedom may be eroded not only through visible repression but also through routinised organisational accommodation to political expectations (Appiagyei-Atua et al., 2016; Savage & Finn, 1999).

Participants' reports of surveillance, constrained teaching, restricted research, and funding pressure also align with international evidence of attacks on higher education. Monitoring reports indicate that these pressures trigger self-censorship, weaken institutional life, and reduce the social benefits universities can offer (Scholars at Risk, 2023). The present findings, therefore, link macro-level evidence to the lived perceptions of academics who have experienced or observed these conditions in African contexts.

The study further underscores the fragility of constitutional protection. Participants repeatedly emphasised the need for the rule of law, principled leadership, public awareness, and stronger legal safeguards. This echoes the literature, which shows that

academic freedom and institutional autonomy are often insufficiently entrenched in legal frameworks, even where education rights are recognised more broadly (Appiagyei-Atua et al., 2016; Shaheed, 2024; UNESCO, 1997).

The study also suggests that constitutional and university reform cannot be meaningfully separated. Participants did not envisage stronger academic freedom arising solely from legal reform; they emphasised the need for institutional accountability, democratic leadership, and public recognition of the value of academic freedom. This supports Hawi's (2010) argument that academic freedom depends on a broader environment of rights, democratisation, and stakeholder participation.

Another notable insight is that participants viewed the curriculum as a site of both vulnerability and possibility. Political interference was seen to distort curricula by privileging state narratives, yet participants also regarded teaching as a long-term means of cultivating democratic values and responsible leadership. This reinforces claims that the university's pedagogical function is inseparable from its democratic function (Hawi, 2010; UNESCO, 1997).

Participants' recommendations for public awareness, leadership development, community engagement, and curriculum reform also extend the discussion beyond legalism. Sustainable academic freedom requires not only enforceable rights but also a social and institutional culture that respects critique, enables dialogue, and does not automatically penalise truth-telling (Kratou & Laakso, 2021; Shaheed, 2024).

Methodologically, the study demonstrates the value of comparative interpretive accounts in research on academic freedom. Indices and legal analyses remain important, but they cannot replace scholars' own interpretations of how turbulence is experienced within higher education systems. By centring African foreign national academics in South Africa, the study offers a perspective that is both empirically grounded and comparatively illuminating (Kivunja & Kuyini, 2017; Moon & Blackman, 2017).

Finally, the perspectives of African foreign-national academics working in South Africa proved especially valuable. Their narratives provided a comparative lens through which academic freedom emerged as a barometer of democratic institutional maturity. Where governance is unstable, leadership is politicised, and accountability is weak, academic freedom becomes precarious; where constitutionalism and institutional integrity are stronger, the conditions for scholarship are more secure (Kratou & Laakso, 2021; Shaheed, 2024).

RECOMMENDATIONS

The findings suggest that protecting academic freedom in turbulent political contexts requires action at constitutional, institutional, governance, and pedagogical levels. First, constitutions and higher education legislation should explicitly protect academic freedom and institutional autonomy as enforceable democratic principles, rather than leaving them implied within broader rights frameworks (Shaheed, 2024; UNESCO, 1997).

Second, universities need protection from partisan interference in leadership appointments, governance structures, and strategic planning. Transparent, merit-based, and institutionally led appointment processes are essential to ensure universities function as autonomous public institutions rather than as extensions of executive or ministerial power (Altbach, 2007a; Appiagyei-Atua et al., 2016). Third, internal university governance must become more transparent and accountable to prevent autonomy from being compromised by corruption, elite collusion, or opaque decision-making (Hawi, 2010).

Fourth, institutions should adopt stronger protections for teaching, research, and the curriculum so that academics are not constrained by surveillance, informal censorship, or funding pressures. Public awareness campaigns, leadership development, and curriculum reform are also necessary, as academic freedom is sustained not only by legal texts but also by democratic cultures that value critique, ethical leadership, and critical inquiry (Andreescu, 2013; Hawi, 2010; Scholars at Risk, 2023).

These recommendations imply that reform must be understood as layered rather than sequential. Constitutional protection without institutional accountability may remain symbolic; institutional autonomy without democratic values may become hollow; and curriculum reform without broader public dialogue may have limited impact. Sustainable academic freedom, therefore, depends on legal safeguards, institutional design, leadership integrity, and civic cultures that protect dissent and scholarly independence (Kratou & Laakso, 2021; Shaheed, 2024; UNESCO, 1997).

CONCLUSIONS

This study shows that academic freedom in selected African contexts is deeply entangled with the quality of governance, institutional autonomy, and democratic accountability. Drawing on the perspectives of African foreign national academics working in South Africa, it demonstrates that academic freedom is weakened by politicised appointments, compromised governance, restrictions on teaching and research, surveillance, funding pressures, and fragile constitutional protection (Appiagyei-Atua et al., 2016; Shaheed, 2024).

The study also shows that academic freedom is understood as more than the liberty to speak or publish. Participants linked it to mobility, access to information, professional security, and the ability to contribute intellectually within one's own society. This broadens dominant understandings of academic freedom and positions it as both an institutional and a democratic condition (Andreescu, 2013; Hawi, 2010).

Although the study is limited by its small purposive sample and focus on four countries, it offers analytically rich insight into how academic freedom is interpreted in turbulent settings. The findings reinforce the view that safeguarding academic freedom requires stronger constitutional protection, depoliticised governance, institutional accountability, and educational cultures that sustain public reasoning and critique (Kratou & Laakso, 2021; UNESCO, 1997).

CONFLICT OF INTEREST

The authors declare that there are no conflicts of interest regarding the publication of this paper.

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ENHANCING FUTURE TEACHERS' COMMUNICATIVE COMPETENCE BY INTEGRATING MODERN TECHNOLOGIES INTO 'ENGLISH FOR ACADEMIC PURPOSES' COURSES

РОЗВИТОК КОМУНІКАТИВНОЇ КОМПЕТЕНТНОСТІ МАЙБУТНІХ УЧИТЕЛІВ
ЗАСОБОМ ІНТЕГРАЦІЇ СУЧАСНИХ ТЕХНОЛОГІЙ У КУРС
«АНГЛІЙСЬКА МОВА ДЛЯ АКАДЕМІЧНИХ ЦІЛЕЙ»

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ABSTRACT

Purpose. This paper addresses the challenges of modern Ukrainian education in relation to the teaching of English for Academic Purposes, which focuses on developing language skills for future professional activities. This paper presents the results of a study investigating the pros and cons of using modern technologies to enhance the professional communicative competence of future teachers in higher education establishments in Ukraine. The article explores ways to improve the English-speaking communicative competence of future teachers using modern technologies.

Methodology. To achieve our goal, we set out some objectives and carried out the research step by step. Firstly, we reviewed the scientific literature on the subject. Then, using the method of expert evaluation, we determined the key modern technologies for improving the English-speaking communicative competence of future teachers. Next, we conducted a pedagogical experiment to identify the most significant modern technologies for developing the English-speaking communication skills of students at a pedagogical university.

Results. The results showed that the most effective methods were mobile-assisted learning (MAL), ChatGPT, and generative artificial intelligence (AI), and automated writing evaluation (AWE). Each of these methods influences language skills differently in undergraduates. Writing and reading were the most influenced. Listening and speaking skills improved less after the pedagogical experiment.

Conclusions. The study conducted allows us to conclude that the aforementioned modern technologies could enhance undergraduates' communicative competence in the English language while studying at educational institutions. They are a powerful means of developing not only language skills, but also critical thinking, academic writing, and argumentation. However, the results also show that there are some disadvantages and ethical complications to using modern technologies, including plagiarism, authorship, and

Мета. У статті розглядається проблема викладання англійської мови для академічних цілей у сучасній українській вищій освіті, що зосереджена на розвитку всіх видів мовленнєвої діяльності майбутніх учителів. У роботі представлені результати дослідження щодо переваг та недоліків використання сучасних технологій для вдосконалення професійної комунікативної компетентності майбутніх учителів у закладах вищої освіти України. У статті досліджуються шляхи покращення англомовної комунікативної компетентності майбутніх учителів за допомогою сучасних технологій.

Методологія. Для досягнення мети було поставлено завдання та проведено крок за кроком дослідження. Спочатку було вивчено наукову літературу з теми дослідження. Потім, використовуючи метод експертної оцінки, було визначено ключові сучасні технології для покращення англомовної комунікативної компетентності майбутніх учителів. Далі було проведено педагогічний експеримент для визначення найбільш значущих сучасних технологій для розвитку англомовних комунікативних навичок студентів педагогічного університету.

Результати. Результати показали, що найефективнішими методами були мобільне навчання, ChatGPT та генеративний штучний інтелект, а також автоматизована оцінка письма. Кожен із цих методів по-різному впливає на мовленнєві навички студентів. Найбільший вплив зазнали письмо та читання. Навички аудіювання та говоріння покращилися менше після педагогічного експерименту.

Висновки. Проведене дослідження дає змогу дійти висновку, що вищезгадані сучасні технології можуть покращити англомовну комунікативну компетентність студентів під час навчання в закладах вищої освіти. Вони є потужним засобом розвитку не лише видів мовленнєвої діяльності, а й критичного мислення, академічного письма та аргументації. Однак результати також показують, що існують деякі недоліки та етичні ускладнення використання сучасних технологій, включаючи проблеми плагіату,

transparency issues. Therefore, lecturers' supervision is necessary, and teachers should use modern technologies properly.

Keywords: *English language communicative competence, language skills, modern technologies, teaching English for academic purposes, undergraduates.*

авторства та прозорості. Тому необхідним є керівництво викладачів, і викладачі мають коректно використовувати сучасні технології.

Ключові слова: *англомовна комунікативна компетентність, види мовленнєвої діяльності, сучасні технології, викладання англійської мови для академічних цілей, студенти.*

INTRODUCTION

By the twenty-first century, English had been adopted by many courses and branches of science and was considered the universal language of the academic, research, and professional worlds. Among the language theories that have emerged stronger than ever before is second language acquisition, which aims to equip learners with the linguistic and higher cognitive skills required to negotiate various academic situations. Consequently, teaching English for Academic Purposes (EAP) focuses on developing high-level language skills, such as grammar and vocabulary, as well as other higher-order skills, such as critical reading, academic writing, and argumentation. These skills are also indispensable for participating in scholarly discourse.

The study (Liu et al., 2024) emphasised the importance of improving conceptual precision to enhance understanding of teacher innovation. Additionally, the scientists emphasise the necessity for methodological advancements that strengthen the rigour of empirical investigations. Furthermore, they advocate theory-driven research to deepen insights into the underlying mechanisms of teacher innovation processes, emphasising the importance of acknowledging both positive outcomes and the possible drawbacks of teacher innovation (Liu et al., 2024; Teng et al., 2024).

In our previous research (Chaika et al., 2024), we confirmed the positive impact of the communicative teaching method on the professional development of English language and literature teachers. This was evidenced by an increased level of foreign language competence among these teachers. There was also an increase in future teachers' motivation to study specialised courses and an improvement in their understanding of the prospects for further professional development. They also demonstrated a readiness to use the acquired competencies in real-life situations and achieved success in communicating in English-speaking spaces.

In the article, the authors (Liubashenko & Kornieva, 2019) examine the outcomes of research into the assessment of dialogic interactive skills in Technical English teaching for tertiary school students. They propose the implementation of dialogic collaborative interaction as a teaching method and an assessment tool. The results of the research confirm that collaborative dialogue has a positive effect on students' communicative competence and their acquisition of skills such as perceiving, understanding, and decoding the content of oral texts; identifying the communicative purpose of interlocutors' utterances by analysing verbal and non-verbal cues; and defining and aligning the style and genre of utterances with stylistic registers in English.

The paper by the Ukrainian scientists (Mykytenko et al., 2022) focuses on developing intercultural communicative competence as an integral part of students' vocational training. The research results indicated that students who focused more on practical training than theoretical knowledge showed better learning outcomes. Methodological guidelines for ESP teachers have been developed.

The results of the analysis make it possible to determine that the research (Nguyen et al., 2021) examines how teacher autonomy in the classroom and school culture influence collective teacher innovativeness through integrated professional learning. It suggests that a collaborative culture would encourage teachers to participate in such activities and that collective participation would enhance their innovativeness. A meta-analysis of forty studies conducted between 2013 and 2021 shows that students who receive AWE feedback consistently improve their early-to-final drafts, particularly with regard to grammar and vocabulary usage (Karatay & Karatay, 2024).

The study (Zeng & Takatsuka, 2009) examines the dialogue of English as a Foreign Language learners in synchronous, task-based, computer-mediated communication. It focuses on whether learners engage with each other in text-based dialogue about language use in order to achieve the task goal, and on how this mutual engagement affects their language learning in the context of computer-mediated communication. The findings revealed that learners did assist each other in paying attention to language forms through collaborative dialogue, consequently enhancing their language learning.

Fast technological progress has paved the way for a reinvention of EAP instruction. Today, a variety of resources, ranging from mobile-assisted language learning applications to automated writing evaluation systems and generative artificial intelligence (AI) platforms such as ChatGPT, facilitate highly personalised, flexible, and interactive learning experiences. This has started to redefine the roles of teachers and learners in twenty-first-century classrooms, creating new pedagogical opportunities, but also raising ethical, motivational, and autonomy-related challenges (Shi et al., 2025; Du & Alm, 2024).

Recent research highlights that, while digital tools have the potential to improve academic literacy and engagement among students, their effectiveness depends heavily on how they are integrated into curriculum design. For example, focusing on forms using mobile technology significantly improves academic vocabulary acquisition (Xodabande & Boroughani, 2023). Similarly, Automated Writing Evaluation (AWE) systems such as Grammarly provide immediate, formative feedback on the quality of writing, promoting iterative skill development and accuracy (Karatay & Karatay, 2024). More recently, ChatGPT has emerged as a promising conversational agent for providing feedback and facilitating practice, although concerns remain about overreliance and reduced creativity (Shi et al., 2025; Du & Alm, 2024).

There is a great number of scientific sources on using mobile technologies with the aim of improving the level of graduates' English (Bernacki et al., 2019; Fu & Hwang, 2018; Melnychyk et al., 2024; Pashko & Pinchuk, 2024). The study of Ukrainian scientists (Knysh et al., 2023) demonstrates that the modernizing higher education by implementing innovative educational technologies can improve the efficiency of the educational process and prepare students for today's challenges.

The findings of the scientists from New Zealand (Du & Alm, 2024) provided practical recommendations for educators seeking to effectively integrate generative AI tools into language education. This study examined English language students' perceptions of using generative AI as a supportive tool for English for Academic Purposes in a university context. Using self-determination theory as an explanatory framework, the study examined how ChatGPT impacted students' basic psychological needs for autonomy, competence, and relatedness in their language-learning experience.

The findings suggested that ChatGPT has the potential to support students' need for autonomy by providing flexibility and personalised feedback, and to support their need for competence by providing a safe space for practice. However, its impact on the need for relatedness was mixed: some students experienced a sense of companionship, while others expressed concerns about reduced human interaction. While students acknowledged the benefits of ChatGPT, they also emphasised the importance of human-teacher interaction and empathy.

The team of scientists (Rakhmanina et al., 2022) emphasised the importance of cross-cutting knowledge and skills that can be applied in practice at the current stage of education. They determined that the spread of useful knowledge created the need for STEM technologies and that a combination of natural sciences, technology, engineering, and humanities is important in modern, rapidly developing society. This is why analysing the development of modern society, especially the latest information technologies, shows the popularisation of science and technology, particularly educational robotics, which is appropriate at all levels of education. The article describes the use of robotics elements in primary school, which allows the educational process to be diversified through the introduction of games and practical activities.

This article examines the issue of teaching English for academic purposes, focusing on developing the English language skills of trainee teachers. It **aims** to explore the current situation, the pros and cons of using modern technologies to improve the professional English communication skills of future teachers in higher education institutions in Ukraine, and how modern technologies can be used to enhance these skills. This article explores the intersection of technology and English for academic purposes, analyzing recent studies to provide insights into how modern tools can enhance academic English learning while addressing their benefits, limitations, and implications for higher education.

METHODOLOGY

Participants

The empirical study was conducted at Oleksandr Dovzhenko Hlukhiv National Pedagogical University and included 74 students from the Educational and Scientific Institute of Pedagogy and Psychology and the Educational and Scientific Institute of Philology and History, at master's degree level. Six experienced lecturers, who are assistant professors (one of them is a professor) and have taught English for over ten years, took part in the process of expert assessment.

Procedure

The first stage of the study involved preparing materials and organising a pedagogical experiment. During this period, an analysis of the scientific literature on the research problem was conducted, the programme for the pedagogical experiment was developed, and diagnostic tools (questionnaires, tests, and plans for recording results) were selected and constructed. Using the expert assessment method, three main contemporary teaching methods for developing students' English-language communicative competence in higher education institutions were identified. We'll describe them in the next section.

The main purpose of the expert assessment was to provide an objective evaluation of the extent to which modern technologies contribute to the development of future teachers' communicative competence in English for Academic Purposes (EAP) courses.

This was achieved by analysing students' oral presentations, written assignments, project work, online discussions, and classroom participation. Experts also reviewed samples of students' academic writing and observed communicative activities performed during technology-enhanced learning sessions. In some cases, standardised evaluation rubrics and scoring scales were employed to ensure the consistency and comparability of the results.

The expert assessment method also validated the findings obtained through quantitative and qualitative analyses. By comparing expert opinions with students' test results, survey responses, interview data, and observations, the researchers ensured methodological triangulation and increased the credibility of the study. The experts' evaluations confirmed that integrating modern technologies had a positive impact on students' communicative competence, particularly with regard to speaking confidence, the quality of their academic writing, interactive communication, and learner autonomy.

The empirical stage of the study involved implementing the developed programme in the educational process, followed by an analysis of the results obtained. Throughout the pedagogical experiment, educational observation was employed as an overarching method to track the dynamics of students' communicative, cognitive, creative, and organisational skills in various educational activities in English.

Within the classroom sub-stage, specially designed tasks and exercises aimed at applying modern technologies to develop communication skills in English, teamwork, critical thinking, and creativity were performed. The level of communication skills was determined using the "Continue the story" and "Describe the picture" exercises. Group projects were used to assess teamwork skills. Critical thinking was assessed using the exercises "What will happen if...?" and "Justify the answer". Creativity was assessed using the exercises "Create your own story" and "Finish the story".

In the extracurricular stage, students were involved in activities such as volunteering and group creative projects to develop their English skills. Virtual excursions in English were conducted, and students were involved in creating presentations and reports using educational platforms. An interdisciplinary approach was implemented through the integration of knowledge from various professionally oriented courses in English in the course of such types of work.

In parallel, English teachers assessed students' communicative skills on a scale from 1 to 12, where 1 represented the lowest level, and 12 represented the highest. The sample included six teachers, one of whom was a Doctor of Pedagogical Sciences and five of whom were Candidates of Pedagogical Sciences. They all teach English to undergraduate and graduate students. All of the teachers had over 10 years' experience, which formed the basis for their involvement as experts.

The final stage of the study involved analysing the work of students and summarising the results of the teacher questionnaire. Descriptive statistics methods were used for the initial assessment of the sample, and qualitative analysis methods were used to analyse the questionnaire and observation results. The qualitative approach enabled us to examine not only measurable learning outcomes, but also students' experiences, attitudes, perceptions, and behavioural changes throughout the educational process. One of the primary qualitative methods employed in the study was observation.

During the implementation of technology-enhanced English for Academic Purposes (EAP) courses, researchers observed students participating in classroom discussions, collaborative tasks, presentations, and online interactions. Particular focus was given to

learners' communicative behaviour, confidence in speaking, engagement in academic communication, and ability to interact effectively in digital learning environments. This enabled us to identify changes in students' communicative strategies and levels of participation throughout the experiment.

Another important qualitative method was conducting semi-structured interviews with students and teachers. These interviews provided deeper insights into participants' perceptions of digital technologies, such as mobile learning applications, artificial intelligence tools, automated writing evaluation systems, and online collaborative platforms. Students discussed the advantages and challenges of using these technologies, while teachers reflected on their effectiveness as teaching tools and their influence on students' academic communication skills. The interviews allowed us to collect rich descriptive data and gain a deeper understanding of individual learning experiences.

We also applied content analysis to evaluate students' written assignments, reflective journals, presentations, and online discussions. This method helped us to identify recurring themes related to the development of communicative competence, including improvements in academic vocabulary, fluency, coherence, argumentation, and interaction skills. Through content analysis, the study examined how students adapted their communication styles when working with digital technologies and AI-assisted educational tools.

Additionally, a case study analysis was conducted to examine successful instances of technology integration in EAP courses. Learning situations, both individual and group, were analysed to determine how technological tools supported communication, collaboration and learner autonomy. The case studies showed how students used technology to complete academic tasks, take part in discussions and enhance their speaking and writing skills.

The study also incorporated a comparative qualitative analysis, enabling us to compare students' communicative behaviour before and after the implementation of modern technologies. Changes in students' confidence, participation, academic interaction, and ability to express ideas effectively in English were analysed. These comparisons provided evidence of the positive influence of digital tools on the development of communicative competence.

Furthermore, the qualitative analysis included interpreting students' feedback from open-ended questionnaires. Participants reflected on their experiences with AI tools, mobile applications, and automated feedback systems, sharing their views on motivation, accessibility, and the effectiveness of digital learning environments. These responses helped us to understand the emotional and psychological aspects of technology-enhanced language learning.

Mathematical calculations, data processing, and analysis methods using Excel were employed throughout the study. To provide a holistic view of the process of developing English-language communicative competence, a comprehensive approach was adopted, incorporating pedagogical substantiation of criteria based on modern scientific literature, generalisation of practical experience, and determination of levels of competence formation. The study was conducted confidentially and in accordance with ethical norms within the framework of extracurricular activities held at the specified higher educational institutions.

RESULTS

At the start of the experimental study, the experts assessed each student's level of English proficiency in all language skill areas: reading, writing, speaking, and listening. Table 1 shows the participants' average results. In general, we can see that receptive skills (listening and reading) are better developed than productive ones (speaking and writing). So, they need to improve. The results of the assessment of students' English proficiency in all language skills by experts are given in the table 1. The table shows the arithmetic mean for each lecturer, based on data from all students in the group.

Table 1

Data on lecturers' assessment of students' English language proficiency during peer review

	Listening	Speaking	Reading	Writing
Lecturer 1	8.4	6.1	7.9	6.8
Lecturer 2	7.5	5.4	8.6	5.9
Lecturer 3	9.6	4.7	9.4	7.3
Lecturer 4	10.2	7.1	6.9	6.6
Lecturer 5	9.3	5.6	8.4	5.7
Lecturer 6	10.8	6.1	7.8	6.4
Average data	9.3	5.8	8.2	6.5

We can see that the most developed skill among students is listening, while the least developed skill is speaking. Therefore, the next stage of our research was aimed at finding the significant tools for developing English language communicative competence. As mentioned earlier, the expert assessment method made it possible to identify the most effective means of developing future teachers' English language communicative competence in higher education institutions. These were *mobile-assisted learning (MAL)*, *using ChatGPT and generative artificial intelligence (AI)*, and *automated writing evaluation (AWE)*.

Mobile-assisted learning plays a significant role since mobile learning is one of the most important innovations in teaching to date. Once language resources are available on phones, tablets, and other portable devices, learners have access to them wherever and whenever they need them. This sort of access enables EAP learners, many of whom have rather demanding academic schedules, to develop their language skills at their own pace. Such settings enhance learner independence, as opposed to traditional settings where the emphasis was usually on instructor-led activities and group work. Using mobile devices, students can customise their learning experience and mix it up with other formats. Researchers Xodabande and Boroughani (2023) obtained similar results and demonstrated the effectiveness of mobile learning for teaching English for academic purposes.

In the research, the scientists found that form-focused instruction (FFI) proved to be a highly effective form of mobile learning for English for Academic Purposes (EAP), in which academic vocabulary was taught through direct and conscious scrutiny by the learner. In the latest study, which involved university students learning English as a foreign language, they demonstrated that the experimental group, who underwent FFI

training using digital flashcards on a mobile device, achieved significantly higher scores than the control group, who were taught using paper-based word lists. The results of the experiment showed that the experimental group improved their knowledge of receptive vocabulary (understanding academic words) and productive vocabulary (correctly using these words in writing and speaking) (Xodabande & Boroughani, 2023). These findings further emphasise the importance of active, deliberate vocabulary learning supported by mobile devices in developing academic literacy.

Despite the advantages it offers, implementing m-learning for English for Academic Purposes remains challenging. Issues to be resolved include gaps in digital literacy, unequal access to technology, and distractions from non-academic apps. These issues must be addressed through effective curriculum design and institutional support. Teachers must ensure they convey the appropriate knowledge regarding these tools and create environments in which learners can practise using them in meaningful academic contexts.

However, our research showed that m-learning remains a facilitator of EAP instruction. Mobile applications link the theory practised in the classroom to the reality of academic work outside the classroom by providing learners with carefully designed, motivating, and efficient means of developing academic vocabulary and reading skills. Purposefully integrating them into language programmes formed an indispensable facet of contemporary web-assisted language learning, correlating with the research of Xodabande and Boroughani (2023).

The development of generative AI tools, particularly ChatGPT, has engendered a radical shift in EAP instruction. ChatGPT provides students with the opportunity to develop critical thinking, problem-solving, and academic writing skills through interaction with an AI system that engages in dialogue and provides personalised feedback. This aligns with the findings of Shi et al., who determined that, unlike older computer programs, ChatGPT engages in interactive, on-demand, contextualised dialogue, which has significant implications for language-learning applications.

Our studies on the role of ChatGPT in EAP contexts demonstrate its effectiveness as a facilitation and motivation tool. The scientists (Xodabande & Boroughani, 2023) found that ChatGPT heightened students' feelings of autonomy and competence, as it gave them the opportunity to practise independently, receive non-judgemental feedback, and experiment with academic language in a safe, low-pressure environment.

This is in accordance with self-determination theory, which states that intrinsic motivation is important for fulfilling students' psychological needs. Conversely, other scientists found that students in the experimental group who used ChatGPT outperformed those relying solely on traditional AWE tools, demonstrating stronger gains in organisation, coherence, and overall writing quality (Shi, et al., 2025).

However, using ChatGPT does carry some risks and trade-offs. Firstly, there is the issue of creativity and the development of the "ideal L2 writing self", as Shi et al. (2025) put it. Overreliance on ChatGPT gives students a shortcut to developing their own academic voice. Du and Alm (2024) also warn that heavy use of ChatGPT may limit meaningful and collaborative peer-instructor interactions. Further complications arise from ethical issues, including plagiarism, authorship, and transparency.

In order to harness ChatGPT's potential and minimise its shortcomings, instructors should consider some form of guided integration. This would mean ChatGPT acting as a supplement to, rather than a substitute for, teacher feedback. Assignments could be

designed to require students to analyse and interpret AI suggestions, building their awareness and understanding of digital literacy from an ethical standpoint. When used thoughtfully, ChatGPT can support EAP learning by providing students with an accessible, personalised approach while maintaining the human elements of creativity, critical thinking, and academic integrity.

Writing correction tools have become an increasingly common feature of Academic English (EAP) classrooms. For example, we used Grammarly and Criterion. These AWE systems were initially designed for large-scale summative assessment purposes, but are now widely used to provide instant formative feedback.

They helped us direct learners to areas such as vocabulary, grammar, organisation and clarity, enabling students to use this feedback to improve and revise their writing independently. Foreign scientists (Karatay & Karatay, 2024) also described the results of their research, which correlate with our own.

Our research proved that AWE systems can potentially considerably increase fluency and linguistic accuracy in writing when used correctly. However, while AWE is effective at addressing lower-order concerns, it is not effective enough at encouraging higher-order academic writing skills such as argument construction, critical thinking, and academic voice.

Ideally, AWE would be combined with teacher feedback, capitalising on the efficiency of machines in correction and the depth of instruction provided by humans. This hybrid approach enables students to benefit from immediate feedback on surface-level issues while also supporting them in the deeper reflective processes required for advanced academic writing. A set of tools that has shaped EAP instruction includes ChatGPT, mobile learning, and automated writing evaluation (AWE). These technologies have made flexible, data-driven, differentiated learning opportunities possible, but they also require very careful pedagogical planning.

The effective implementation of these new EAP trends depends on blended learning models. Face-to-face sessions facilitate critical discussion and collaborative activities, while mobile-assisted tools help undergraduates to acquire academic vocabulary and reading skills outside the classroom (Xodabande & Boroughani, 2023). In contrast, AWE provides real-time feedback on lower-order concerns, enabling teachers to engage in discussions about higher-order academic skills, such as argumentation and rhetorical strategies.

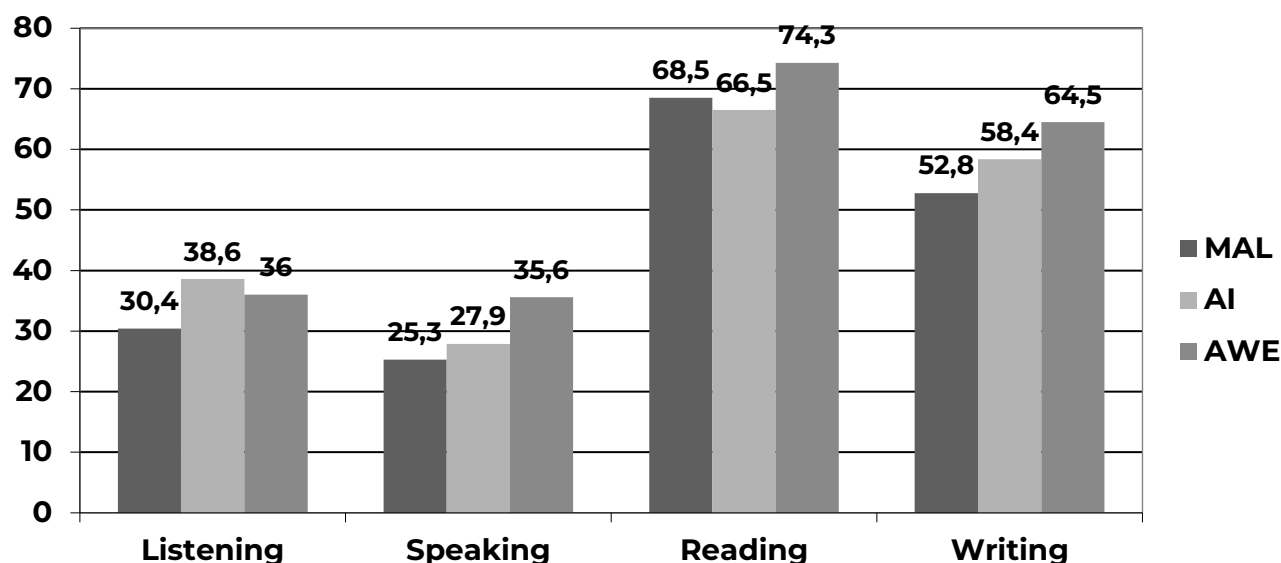
Supervision is likewise needed when students use ChatGPT. Although ChatGPT may encourage independent thinking and provide specific feedback, reliance on it can undermine intrinsic motivation and creativity. Faculty members sometimes had to encourage virtuous use of AI and help students address critical issues with AI suggestions, such as plagiarism and lack of a genuine academic voice.

Last but not least, digital literacy should lie at the heart of EAP programmes to ensure equal access for all and maximise the benefits of these technologies. Through this combination of technological progress and human-facilitated instruction, an EAP programme can equip learners with the language knowledge and digital skills required to thrive in global, technology-based academic environments.

After using the above-mentioned tools to develop the English-speaking communication skills of undergraduates, the influence of each tool on all language skills was analysed. The results are shown in the diagram (see Figure 1).

Figure 1

The influence of modern technologies on students' proficiency in all English language skills



The results of the study show that various modern technologies impact different language skills. Mobile learning, in particular, has improved students' vocabulary the most, which in turn improves their listening and reading skills. ChatGPT has improved the speaking and expression skills of master's students. AWE significantly improved the writing skills of university students.

The diagram shows how modern educational technologies influence the development of four key language skills. The data clearly demonstrate that the impact of each technology varies, with certain tools being more effective for specific competencies. In the area of listening, for example, AI had the greatest impact (approximately 39.7), followed closely by AWE (36). In contrast, MALL had the lowest score (30.4). This suggests that AI-powered tools, likely through interactive dialogue, speech recognition, and contextualised responses, provide richer auditory input and more dynamic listening practice. Although mobile learning also supports listening through multimedia content such as podcasts or videos, it appears to be less adaptive than AI systems.

In terms of speaking skills, AI once again takes the lead with a score of 27.9, outperforming both AWE (35.6) and MALL (25.3). Although AWE is not usually intended for oral communication, its relatively high score may reflect indirect benefits, such as improved language structure that can be applied to speaking. Nevertheless, AI's conversational capabilities make it the most effective tool for improving oral proficiency, especially for master's students who need more advanced expressive skills and real-time feedback.

The most notable differences are observed in reading skills, where AWE achieves the highest score (74.2), which is slightly higher than the scores achieved by MALL (68.5) and AI (66.5). This suggests that tools designed for text analysis and feedback can significantly improve reading comprehension by exposing learners to structured texts and encouraging attention to detail. MALL also performs strongly in this area, likely due to its accessibility and exposure to diverse reading materials. While still effective, AI may be slightly less focused on sustained reading tasks than the other technologies.

AWE's most notable advantage lies in its ability to significantly enhance writing skills, outperforming both AI (60.4) and MALL (52.8) by approximately 14 points. This is to be

expected, given that AWE systems are specifically designed to evaluate written texts, provide corrections, and offer suggestions for improvement. They help students to refine their grammar, coherence, and academic style, making them particularly valuable for university-level learners engaged in formal writing tasks.

Overall, the diagram shows that MALL is particularly beneficial for vocabulary acquisition and foundational skills, which indirectly support reading and listening. AI technologies, such as ChatGPT, excel in the interactive and communicative aspects of language learning, particularly in terms of speaking and expressive abilities. Meanwhile, AWE systems are most effective in developing literacy-related skills, particularly writing and reading, due to their focus on textual analysis and feedback.

Table 2
English proficiency of university students in all language skills before and after the pedagogical experiment

	Listening		Speaking		Reading		Writing	
	Before	After	Before	After	Before	After	Before	After
MAL	9.3	9.5	5.8	6.2	8.2	9.4	6.5	7.8
AI	9.3	9.6	5.8	7.1	8.2	9.6	6.5	8.1
AWE	9.3	10.2	5.8	7.3	8.2	10.2	6.5	8.3
Average	9.3	9.8	5.8	6.9	8.2	9.7	6.5	8.0

The results of the study, presented in Table 2, show that our methodology is effective, as students’ reading and writing skills have improved significantly. This growth was facilitated by the use of automated writing evaluation. Generative artificial intelligence, in particular ChatGPT, has contributed to improving students’ spoken English. In conclusion, the findings emphasise the importance of integrating multiple technologies into language education. Rather than relying on a single tool, a blended approach enables educators to utilise the strengths of each technology, thus supporting the development of all four language skills.

DISCUSSION

The results align with and extend existing scholarship on developing English language communicative competence in higher education in Ukraine (Ptushka, 2024), particularly research addressing the use of modern technologies in the university education process (Gulich & Chetveryk, 2025). In a broader disciplinary context, a team of Ukrainian scientists (Mykytenko et al., 2022) identified intercultural communicative competence development as the main quality of modern journalism students. However, there are some challenges associated with using modern tools for learning English (Kostikova et al., 2024). Our findings corroborate concerns about the fact that a substantial proportion of students are unable to engage in fully online learning.

However, some issues regarding research are being discussed. *Firstly*, AWE systems provide instant corrections of grammar, spelling, punctuation, vocabulary usage and sentence structure. Students receive feedback immediately after writing, allowing them to revise and improve their work multiple times. *Secondly*, AWE tools analysed elements such as coherence, cohesion, organization, lexical diversity, and academic style. These are precisely the elements that determine writing quality, so the feedback was highly targeted. *Thirdly*, students increased their writing practice and were more willing to

write multiple drafts when feedback was available instantly. Moreover, frequent revision strengthens writing competence and self-editing skills. Personalized learning was useful as AWE identified individual weaknesses and provided recommendations tailored to each student. Students could focus on their specific writing issues rather than receiving general feedback. At the same time, the advantage for teachers was reduced workload. Teachers could devote more time to higher-level aspects of writing, leaving the system to handle routine corrections. Consequently, students receive more comprehensive support.

In our research, we used AI for interactive communication. AI tools simulated real conversations, creating opportunities for meaningful interaction. Students could engage in dialogues, role plays, interviews and discussions at any time. Moreover, they experienced reduced speaking anxiety, often feeling less nervous when speaking with AI than with teachers or classmates (Gulich & Chetveryk, 2025). This reduction in anxiety increased their participation and willingness to communicate. It is worth noting that the students had unlimited conversational practice, as, unlike classroom interaction, the AI was available at any time and the students could practise speaking as often as they wanted. The research showed that developing communicative competence with the help of AI encouraged spontaneous responses, negotiation of meaning and argumentation, and that these skills were central to oral communication. Furthermore, the students experienced authentic language exposure, as AI provides natural conversational models and exposes learners to varied vocabulary and discourse patterns, enhancing fluency and speaking confidence.

The rather unexpected findings can be explained by the fact that each technology directly supported the skill for which it was designed. AWE improved writing through continuous corrective feedback, revision and text-focused analysis, while AI conversational tools influenced speaking improvement through interactive dialogue, communicative practice and increased learner engagement.

These results are consistent with current research on technology-enhanced language learning, which suggests that educational technology is most effective when its functionality is aligned with the target language skill.

Another unexpected finding of the study was the relatively high impact of Automated Writing Evaluation (AWE) on students' listening performance. However, we can explain the result with several factors. Firstly, AWE tools expose learners to extensive written input and corrective feedback, contributing to vocabulary acquisition and greater language awareness. Improved vocabulary knowledge is strongly associated with better listening comprehension, as learners can recognise and process a wider range of lexical items during listening tasks. Secondly, AWE platforms provided explanations of language errors and suggestions for improvement, helping students to develop metalinguistic awareness, which facilitates the comprehension of spoken language. Thirdly, the repeated processes of drafting, revising and analysing feedback may enhance overall language proficiency, which can then be transferred to receptive skills such as listening.

Despite the positive findings, several limitations should be acknowledged. Firstly, the study was conducted at a single university, which may restrict how widely the results can be applied. The institutional characteristics, curriculum design, technological infrastructure and student demographics could all have influenced the outcomes. To increase external validity, future studies should involve multiple universities from different regions and educational contexts. Secondly, the sample size was relatively small. While the number of participants was sufficient for exploratory analysis, a larger

sample size would provide more reliable statistical evidence and enable more robust comparisons between different technological interventions. Thirdly, the study partly relied on expert evaluation to assess students' communicative competence. Although experienced EAP instructors were involved and the evaluation criteria were standardised, a certain amount of subjectivity cannot be ruled out. The assessment process may have been influenced by individual perceptions of students' speaking, writing and communicative performance. Future research could complement expert judgements with additional objective measures, such as standardised language proficiency tests or automated performance analytics. Another limitation concerns the duration of the intervention. As the study only measured outcomes over a specific instructional period, the long-term sustainability of the observed improvements was not examined. Longitudinal studies would be valuable in determining whether the benefits of technology-enhanced EAP instruction persist over time.

CONCLUSIONS

Thus, in the context of the evolving educational landscape, the most relevant and progressive methods of teaching English at university level are mobile-assisted learning, ChatGPT and other forms of generative artificial intelligence, and automated writing evaluation. These modern technologies are a promising addition to higher education, covering various language skills and enabling students to communicate wherever and whenever they want. They enable students to recognise and hone abilities relevant to social professions, while fostering critical thinking, problem-solving and analytical skills – all of which are integral to real-life situations and allow students to apply their acquired competencies in practice.

The rapid developments in digital technologies have thus brought about a major reform of EAP instruction. Mobile-assisted learning environments have enriched academic vocabulary and reading strategies, providing learners with anytime, anywhere access to study resources for independent learning. If used carefully to avoid dependency issues and ethical concerns, generative AI tools, especially ChatGPT, can act as an interactive, one-to-one tutor, promoting learner independence and enhancing writing skills academically. Conversely, AWE systems can provide instant feedback on grammar and organisation when used alongside teacher-led feedback, thus speeding up the revision process.

A progressive technology-oriented blended approach that strikes a balance between innovative schooling and human interaction is now poised to be accepted for EAP instruction. These tools, when used judiciously by instructors, will help develop students who have not only advanced academic proficiency but also great digital literacy skills. Students thus prepared will undoubtedly enter academic setups that speak increasingly in a global and technology-driven milieu.

CONFLICT OF INTEREST

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