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Gamification of formative assessment in primary school through the development and implementation of courses using Minecraft by future computer science teachers

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Abstract. Gamification and formative assessment have gained increasing attention in education as effective strategies for enhancing student engagement and learning outcomes. The study aimed to determine how such an approach influences students' motivation, comprehension of key informatics concepts, and the development of digital competencies among future educators. The research involved future computer science teachers for design and implementation of interactive lessons using Minecraft to facilitate learning and assess students' progress. The study investigated the effectiveness of using Minecraft Education as a gamified tool for formative assessment in primary school informatics education. The results indicated that integrating gamified formative assessment significantly enhanced students' interest, engagement, and comprehension. Future teachers also gained valuable experience in designing student-centred learning activities using Minecraft, demonstrating improved pedagogical skills and effective use of digital tools. The results indicated that students demonstrated increased interest, engagement, and comprehension when formative assessment was embedded in a gamified environment. Additionally, future teachers gained valuable experience in designing student-centred learning activities, fostering creativity, and utilising digital tools effectively. Statistical analysis confirmed the positive impact of gamified formative assessment on learning outcomes. The study suggested that incorporation of digital game-based learning strategies into teacher education programs can significantly enhance pedagogical skills and the ability to create interactive learning experiences. The study concluded that gamification can be an innovative and effective approach to formative assessment in informatics education, providing students with immediate feedback while maintaining their motivation. The findings of this study have practical implications for primary school teachers, informatics educators, and curriculum developers seeking to integrate gamified approaches into the learning process. The results offer insights into leveraging Minecraft Education for formative assessment, which can enhance student engagement and improve learning outcomes

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Keywords: informatics education; digital learning; teacher training; interactive learning; student engagement; educational technology



INTRODUCTION

Formative assessment, a dynamic and student-centred approach, is pivotal in contemporary education, fostering deeper learning by providing real-time feedback and encouraging self-reflection. However, traditional formative methods often struggle to engage modern digitally immersed learners, particularly in primary education. Gamification, especially through platforms such as Minecraft Education Edition, offers a solution by creating immersive, interactive learning environments that seamlessly integrate assessment with engaging problem-solving scenarios.

Authors M. Singh & D. Sun (2025) explored the potential of Minecraft Education Edition as a metaverse-like platform for STEM education, involving 40 students in collaborative learning tasks related to Chemistry, Coding, and AI Education. Using the Game Experience Questionnaire (GEQ) and the STEM Outcome Survey, the researchers analysed student engagement, social presence, and learning outcomes. The study revealed that Competence, Flow, and Challenge significantly enhance immersion, supporting the idea that Minecraft fosters deep learning experiences. The study concluded that Minecraft Education Edition enhances social presence, promotes behavioural involvement, and reduces negative social interactions, making it a promising educational tool for STEM learning. The authors recommend further customised Minecraft environments to improve game-based learning strategies.

E.J. Slattery *et al.* (2024) analysed experiences of teachers using Minecraft Education Edition in Irish primary schools as part of the Irish national project-based initiative Future is MINE. Through semi-structured interviews with 11 teachers, the study identified six key themes: enhanced student collaboration, increased creativity, active learning participation, inclusivity, curricular integration, and barriers to adoption. The study determined Minecraft's role in fostering 21st century skills while rendering learning more engaging and accessible. However, the study also highlighted technological barriers that hinder implementation and suggests solutions for improving Minecraft-based learning in primary classrooms.

In the study by C.L.S. Tablatin *et al.* (2023) investigated the impact of Minecraft-based STEM education through the What-If Hypothetical Implementations in Minecraft (WHIMC) project, conducted in the Philippines. Using pre- and post-STEM Interest Questionnaires (SIQ) and the Game Experience Questionnaire (GEQ), the study assessed changes in students' interest in STEM subjects. Results showed a minimal overall effect on STEM interest, though students demonstrated greater awareness of the importance of studying for STEM careers. While no significant difference was found in the overall game experience between high- and low-performers, high-performers reported higher immersion levels, indicating a more engaging and enjoyable experience. The study concluded that efficient STEM learning in Minecraft requires both engaging gameplay and well-structured educational tasks, as open-ended exploration alone can be challenging even for top-performing students.

E.J. Slattery *et al.* (2023) explored experiences of primary school students with Minecraft Education during a national project-based initiative in Ireland. The study followed a two-phase approach, where students first learned how to use Minecraft Education and then participated in a national competition to design a sustainable community. Using a mixed-methods design, the study surveyed 173 students (grades 3-6) and conducted focus group interviews with 30 sixth-grade students. Findings revealed that students found Minecraft Education engaging, easy to use, and beneficial for creativity and collaboration. Thematic analysis identified five key themes: collaboration, creativity, immersive learning, student engagement, and digital skills development. The study highlights the value of project-based learning with Minecraft in fostering 21st-century skills and enhancing student learning experiences.

Scientists M. Nkadameng & P. Ankiewicz (2022) investigated the affordances of Minecraft Education Edition as a game-based learning tool for teaching atomic structure in junior high school. Using a qualitative approach, the study observed and interviewed 20 eighth-grade students in a South African private school, aligning the intervention with the national curriculum. Findings showed that Minecraft Education motivated students, increased engagement, and facilitated critical thinking and collaboration while rendering the atomic structure less abstract. However, not all Minecraft crafting station features promoted deep learning, highlighting the need for further research on which game elements best support conceptual comprehension. The study suggested further exploration of online Minecraft-based interventions and expand the application to other curriculum topics and diverse learning contexts.

S. Bourdeau *et al.* (2021) explored the use of Minecraft Education Edition as a simulation-based training platform for teaching agile project management. The study involved 153 university students who applied the Scrum framework to execute a simulated project within Minecraft. Findings revealed that students had a highly positive perception of their learning experience, describing it as both stimulating and challenging. The study highlights the potential of using "readymade" virtual world platforms like Minecraft for immersive, interactive, and engaging education, offering practical recommendations for educators seeking to integrate information and communication technologies (ICT) into teaching and learning.

In the study by N. Klimová *et al.* (2021) explored the use of Minecraft: Education Edition as online game-based learning tool during the COVID-19 pandemic. The study organised an online programming contest aimed at lower-secondary school pupils as part of the EU Code Week initiative in Slovakia. The contest involved ten programming tasks based on the Slovak Informatics curriculum for grades 5-6, covering topics such as case analysis, sequences of commands, loops, and debugging. The results of the contest were analysed by age and gender to assess the success of the students in solving the tasks, highlighting the effectiveness of Minecraft in engaging students with programming concepts.

Assessment is a fundamental part of the learning process, shaping not only how students comprehend and engage with educational content but also affects progress perception. Among various approaches, formative assessment can be noted as an essential tool for guiding students through their learning journey. In contrast to traditional summative assessments, which evaluate knowledge at the end of a unit or course, formative assessment is continuous, dynamic, and student-centred. It provides real-time feedback, identifying areas for improvement for students while enabling teachers to adapt instruction accordingly. This process fosters improved comprehension, encourages self-reflection, and ensures more meaningful learning outcomes. The study aimed to develop and implement a gamified course for student-teachers, which integrates teaching methodologies for primary school informatics with the use of Minecraft as a formative assessment tool. The research objectives included:

- 1) Development and implementation of methods for using Minecraft to create interactive and engaging lessons for primary school students.
- 2) Training of future teachers to integrate formative assessment into a Minecraft environment to monitor and improve student progress.
- 3) Evaluation of the effectiveness of gamified lessons developed in Minecraft on student engagement, learning outcomes, and the quality of formative assessment.

MATERIALS AND METHODS

Participants were divided into two groups: a control group and an experimental group. The control group received traditional methods of teaching informatics, while the experimental group underwent training focused on gamification and the use of Minecraft as an educational tool. The evaluation of the experiment focused on several criteria. Firstly, the quality of the lesson plans developed by the students was assessed, ensuring alignment with learning objectives and effective use of in-game assessment tools. Secondly, the perceived readiness of the students to apply Minecraft in their future teaching was measured, gauging their proficiency with the methodology. Additionally, the response of primary school students to the Minecraft-based lessons was examined, focusing on their level of motivation and engagement, as well as the overall learning outcomes. Lastly, the effectiveness of formative assessment was evaluated, examining student comprehension of the material before and after the lesson. Therefore, the evaluation criteria were as follows:

- Quality of developed lesson plans (alignment with learning objectives, use of in-game assessment tools).
- Readiness of students to apply Minecraft in their future teaching (level of proficiency in the methodology).
- Primary school students' response (motivation, engagement, learning outcomes).
- Effectiveness of formative assessment (students' comprehension of the topic before and after the lesson).

For data processing, a 12-point scale was used for each of the four evaluation criteria. Data collection methods

included surveys, teacher observations, and testing. A total of 12 students participated in the study, with 7 in the control group and 5 in the experimental group. For statistical analysis, the Mann-Whitney U-test was applied, which is well-suited for small sample sizes, to determine any significant differences between the two groups. The Mann-Whitney U-test was used to compare the distributions of two independent groups. The test was based on the ranks of the data, and it calculates two U statistics, U_A and U_B , for the two groups.

The formula for U_A is:

$$U_A = R_A - \frac{n_A(n_A+1)}{2}, \quad (1)$$

where: R_A – sum of ranks for the control group, n_A – number of participants in the control group.

Similarly, the formula for U_B is:

$$U_B = R_B - \frac{n_B(n_B+1)}{2}, \quad (2)$$

where: R_B – sum of ranks for the experimental group, n_B – number of participants in the experimental group.

The final test statistic is:

$$U = \min(U_A, U_B). \quad (3)$$

This study employed an experimental design to investigate the effectiveness of gamified formative assessment using Minecraft Education in primary school informatics education. The research involved future computer science teachers who developed and implemented Minecraft-based lessons for primary school students. The research stages began with a theoretical preparation phase, during which participants from both the control and experimental groups studied key concepts related to gamification, formative assessment methods, and the educational applications of Minecraft. Following this, the experimental group engaged in practical training sessions, prioritising the introduction to Minecraft Education and its built-in assessment tools, such as quests, building tasks, Redstone mechanisms, and Non-Player Characters (NPCs) for feedback.

Data collection involved a combination of surveys to assess primary school students' motivation, engagement, and comprehension; teacher observations to evaluate the quality of the lesson plans and the implementation process; testing to measure students' comprehension of the material before and after the lessons. The survey was conducted as part of a broader mixed-methods approach to assess the effectiveness of using Minecraft Education Edition in formative assessment. Data collection included surveys completed by primary school students and student teachers involved in both the experimental and control groups. For primary students, the survey addressed the motivation, engagement, and perceived comprehension of the material after the lessons. Questions were phrased in age-appropriate language, and where necessary, teachers assisted students in interpreting the content to ensure reliable responses. For

the student teachers, the survey addressed the readiness to use Minecraft in the classroom, impressions of how well the game-based tools supported formative assessment, and observations of student reactions.

All surveys were conducted after the intervention, with responses collected anonymously and voluntarily to encourage honesty and minimise bias. In addition to the surveys, teacher observations and student test results were used to triangulate the findings. The data obtained from these tools were analysed both qualitatively, through thematic coding of open-ended responses and observations, and quantitatively, using the Mann–Whitney U-test to identify statistically significant differences between the control and experimental groups. This combination of student feedback, teacher reflection, pre- and post-lesson assessment provided a comprehensive picture of how gamified formative assessment affected student learning and engagement.

The collected data were analysed using the Mann–Whitney U-test to determine significant differences between the control and experimental groups, with evaluation criteria including the quality of lesson plans, student readiness to apply Minecraft, primary school student responses, and the effectiveness of formative assessment. The methods employed included Minecraft Education Edition as the primary tool for developing and implementing gamified formative assessment, the Mann–Whitney U-test as the statistical method to analyse the differences between the experimental and control groups, and qualitative methods, specifically surveys and observations, to gather feedback on student engagement and teacher implementation.

The structured approach was used for a comprehensive evaluation of the impact of Minecraft-based gamified formative assessment on primary school informatics education. The experiment unfolds in a series of stages. Initially, students from both groups underwent a theoretical preparation phase, learning key concepts such as gamification, formative assessment methods, and how Minecraft can be used in primary school settings. Afterwards, the experimental group participated in a practical session where students were introduced to Minecraft Education and learned to utilise its built-in assessment tools, such as quests, building tasks, Redstone mechanisms, and NPCs for feedback. Once students were comfortable with Minecraft, the participants from the experimental group were tasked with designing personal interactive lessons. These lessons were centred around Minecraft, incorporating elements such as signage, digital success tables, and in-game tests to provide formative assessments. The lessons were then validated by conducting open lessons in primary schools with implemented Minecraft-based learning environment, gathering feedback from primary school students on motivation, engagement, and material comprehension.

Prior to the study, ethical approval was obtained from the school. Informed consent was obtained from the parents or legal guardians of all participating primary school students. Assent was also obtained from the students themselves, where appropriate, ensuring their voluntary

participation. All data was anonymised to protect the privacy of the participants, and the study adhered to the ethical guidelines and principles. All research activities were conducted following established ethical guidelines for educational research, particularly the ethical standards outlined in the Ethical guidelines for educational research (2018). The study respected participant confidentiality, ensured voluntary participation, and provided the right to withdraw at any stage without consequences. No identifying information was disclosed, and data were used solely for academic purposes.

RESULTS AND DISCUSSION

Assessment is a fundamental part of the learning process, shaping not only how students comprehend and engage with educational content but also how personal progress is perceived. Among various approaches, formative assessment is notable as an essential tool for guiding students through learning. In contrast to traditional summative assessments, which evaluate knowledge at the end of a unit or course, formative assessment is continuous, dynamic, and student-centred. It provides real-time feedback, helping students identify areas for improvement while enabling teachers to adapt instruction accordingly. This process fosters expands comprehension, encourages self-reflection, and improves learning outcomes.

At its core, formative assessment is about learning in progress, not just measuring results. It transforms the classroom into an environment where mistakes are viewed as opportunities rather than failures. As students receive immediate feedback, a sense of progress over learning is developed, gradually building confidence in the abilities. The traditional model of grading often discourages risk-taking, as students fear low scores that might impact their overall performance. Formative assessment, on the other hand, develops a growth mindset, motivating students to experiment, explore, and refine the knowledge through active participation. However, implementation of effective formative assessment strategies in primary education presents certain challenges. Many teachers struggle with integrating assessment seamlessly into lessons without overwhelming students or disrupting the flow of learning. There is also the issue of engagement – traditional formative assessment techniques, such as quizzes, written reflections, or verbal questioning, may not always captivate young learners, particularly in an era where digital technologies dominate daily experiences. This is where gamification is a notable solution, providing an engaging, interactive way to assess students in real-time while maintaining their interest and motivation.

One of the most effective platforms for gamifying formative assessment is Minecraft Education Edition. Originally designed as a sandbox video game, Minecraft has evolved into a versatile educational tool, offering a unique way to integrate problem-solving, creativity, and collaboration into the learning process. In contrast conventional educational software, which often feels restrictive and structured,

Minecraft enables students to explore, build, and interact with a dynamic world that mirrors real-life problem-solving scenarios. It provides an immersive environment where students engage with learning materials in a natural and enjoyable way. The power of Minecraft in education is determined by rendering abstract concepts tangible. Whether students are designing historical landmarks, simulating ecosystems, or programming logic-based circuits with Redstone, knowledge is constructed actively rather than passive information absorption. This level of engagement is crucial for formative assessment as it enables teachers to observe students' thought processes in action. Instead of simply grading an answer on paper, educators can view how students approach challenges, what causes struggle, and what strategies should be used to overcome obstacles.

Minecraft is particularly effective for formative assessment as it provides instant feedback loops. For example, students working on a coding challenge within Minecraft can immediately note whether their commands function as intended. If something doesn't work, the approaches can be tweaked, enabling idea verification without penalties. This aligns with the principles of formative assessment, which emphasise trial, reflection, and improvement. Moreover, Minecraft's collaborative nature enables peer assessment, where students learn from each other, exchange feedback, and refine skills together.

Another key advantage is that Minecraft naturally integrates different types of formative assessment without creating an atmosphere of a test. Teachers can monitor progress through in-game achievements, observation of student creations, or structured challenges where students demonstrate comprehension in a hands-on manner. Additionally, built-in tools such as NPCs (non-player characters) for providing hints, digital signboards for instructions, and Redstone mechanisms for interactive quizzes can be used by educators to design assessment experiences to feel as engaging adventures rather than traditional tests. In primary education, where play-based learning is essential for cognitive and social development, Minecraft provides a bridge between structured learning objectives and student-driven exploration. The open-ended nature of the game fosters critical thinking, adaptability, and perseverance – key skills that are beneficial beyond academic success. When formative assessment is embedded in such an engaging environment, students internalise learning goals more effectively, taking an active role in education rather than being passive recipients of information.

As education continues to evolve in the digital age, the need for innovative assessment approaches becomes more pressing. Formative assessment, when combined with gamification and digital tools such as Minecraft, has the potential to transform learning into a more engaging, personalised, and effective experience. By leveraging Minecraft's ability to immerse students in meaningful problem-solving scenarios, teachers can ensure that assessment is not just about measuring what students know but about assisting in development and success. Minecraft Education is more

than just a game; it is an innovative educational platform that renders learning more realistic, which traditional methods could not achieve. It is built to engage students in a fun, interactive, and immersive environment where exploration, creation, and learning is done while developing critical skills. What sets Minecraft Education apart is its versatility – teachers can use it for a wide range of subjects, from math and science to history, language arts, and coding. One of the key features of Minecraft Education is the variety of educational tools. The game provides a rich variety of in-game elements that are tailored to support different learning outcomes. For instance, there are "Lesson Plans" designed to guide educators on how to efficiently incorporate Minecraft into curriculum. These plans often come with ready-made worlds, which are pre-designed environments or scenarios that students can explore. Teachers can also create worlds and crafting lessons that fit their students' needs.

Minecraft Education is beneficial in hands-on, project-based learning. For instance, students can collaborate to solve problems or complete quests, which helps develop teamwork, critical thinking, and problem-solving skills. For instance, during the "sustainable community" project, students in the experimental group collaborated to design and build virtual cities within Minecraft, requiring critical thinking to solve resource management challenges and develop collaborative strategies to achieve their goals. The quests designed for the coding lessons required students to problem-solve in real time, for example if an NPC gave a student a task to create a Redstone circuit, the student had to problem solve to make the circuit operational, and then collaborate with other students to create larger circuits. The increase in student motivation can be partially attributed to the project-based learning that Minecraft Education provides, as the students were able to collaborate, and problem solve, while working on the given tasks.

In the presented study, students were tasked with designing and constructing virtual environments that required collaboration, problem-solving, and critical thinking. For instance, during the coding lesson, the students were to collaborate on Redstone circuit creation. This active engagement in project-based tasks contributed to the enhanced student engagement and improved problem-solving skills observed in the experimental group. Furthermore, this aligns with previous research that has demonstrated the ability of the platform to improve student collaboration. The game also included tools for formative assessment, such as NPCs (non-playable characters) that can provide feedback, or digital success tables where students can track the progress. The tools not only help in teaching but also offer ways for teachers to monitor how well students are grasping concepts in real-time. Another feature is the Code Builder, which introduces students to the coding in a visual and accessible way. By using block-based programming (similar to Scratch), students can create personal in-game events and mechanisms, bringing computational thinking into learning experience. This is

especially beneficial for teaching computer science and STEM subjects, as it demonstrates abstract concepts through tangible, interactive experiences. Minecraft Education also encourages creativity, enabling students to build structures, explore historical sites, and even recreate

real-world environments, rendering subjects such as history and geography less abstract. It supports diverse learning styles, with visual and kinesthetic learners thriving in the hands-on approach Minecraft offers, while auditory learners can benefit from the in-game lessons and guides (Fig. 1).



Figure 1. Thematic lesson sets in Minecraft Education

Source: screenshot from Minecraft Education Edition

In terms of efficiency, research and feedback from educators have shown that Minecraft Education can significantly boost student engagement. It transforms lessons from passive activities into active experiences. Students are not just memorising facts – learned material is applied in a fun and meaningful environment. Minecraft also promotes self-directed learning, as students often must employ trial and error, which encourages resilience and improves comprehension. Minecraft Education can be efficient in formative assessment, providing real-time insights into students' understanding. One of the most engaging features in Minecraft is the use of NPCs (non-playable characters) to provide feedback. In this context, the students – future teachers – developed and implemented these NPCs as part of an interactive learning experience for teaching computer science to elementary school students. These NPCs act as virtual assistants within the game, guiding students, offering hints, and assessing their progress.

The process began with the students creating NPCs within the game world. Students placed the NPCs in various locations, such as classrooms, mazes, or simulated computer labs, where NPCs would interact with students during learning tasks. For instance, in a lesson on basic programming concepts, an NPC might be positioned near a set of blocks that students must arrange correctly to “code” an action in the game. In this study, the “World Game Code” from the Minecraft Education Edition's Computer Science lesson library was used as a foundational tool for introducing primary school students to basic programming concepts. As illustrated in Figure 2, this pre-designed world provided an interactive environment where students could visually manipulate code blocks to control in-game actions. The future computer science teachers utilised this world to design formative assessment tasks, such as challenges requiring students to sequence commands correctly

to navigate obstacles or solve puzzles. This ensured real-time observation of students' problem-solving processes and immediate feedback through in-game Non-Player Characters (NPCs), enabling teachers to assess student comprehension and adapt their instruction accordingly.



Figure 2. World Game Code from the Computer Science lesson library in Minecraft Education Edition

Source: screenshot from Minecraft Education Edition

Once the NPCs were positioned, the students programmed actions using the “Agent” feature, a simple block-based coding interface that does not require extensive programming knowledge. This was used to design how the NPCs would interact with students – what dialogues would display and what actions would be done in response to students. The key to using NPCs as a formative assessment tool is in designing an interaction algorithm that provides students with immediate, personalised feedback based on performance. For instance, if the task was for students to write a simple algorithm to move a Minecraft character to a specific spot, the NPC would evaluate whether a student

used the correct commands and offer feedback accordingly. If a student wrote the correct sequence, the NPC might say, "Great job! Your code is correct. You've moved the character across the course!" If the sequence was wrong, the NPC would gently guide the student, saying, "Hmm, it looks like the character didn't move. Did you check the order of the commands? Try again!"

As the students progressed, the NPCs would offer additional guidance based on the student's struggles, such as, "Remember, in programming, the order of commands matters. What happens if you switch the jump and move commands?". This created an interactive feedback loop where the NPCs not only assessed students' work but also supported learning with helpful hints. The students also designed the learning world to reinforce coding concepts, setting it up as an obstacle course or puzzle that students needed to solve using basic programming commands. Students integrated challenges such as moving, jumping, and performing tasks such as collecting items, with NPCs acting as assessors and mentors, providing feedback based on the students' success or failure in completing each task. The world was structured in a way that challenged students' knowledge of programming concepts, such as sequencing, loops, and conditions. Each stage of the world had an NPC that assessed the students' comprehension and offered tailored feedback.

To make this system effective, the students needed access to Minecraft Education Edition, where these features are available, and knowledge of how to use the "Code Builder" and basic programming interface. This initial learning process, although requiring some effort, developed interactive lessons and formative assessment tools for students that could be used by elementary students to learn computer science concepts. Students also developed a learning objective and lesson plan that integrates the interactive features of Minecraft with the necessary core concepts to be taught. In a computer science class on learning the basics of programming, the NPCs created were used to assess how well students comprehended these concepts and provided the guidance required to succeed. Figure 3 illustrates the Non-Player Character (NPC) feature within Minecraft Education Edition, a key tool utilised by the future computer science teachers in this study. The NPC, as depicted, served as a virtual assistant within the Minecraft world, programmed to deliver instructions, provide hints, and offer real-time feedback to primary school students during their learning activities. This interactive element facilitated formative assessment by enabling teachers to observe student progress and comprehension through the NPC's responses and interactions, enhancing the dynamic and personalised learning experience.



Figure 3. NPC (Non-Player Character) in Minecraft Education Edition

Source: screenshot from Minecraft Education Edition

During the training, student teachers discovered and implemented various Minecraft tools to enhance formative assessment, one of the most useful being digital progress charts. These charts were used by primary school students to track progress throughout the lesson, rendering the learning process more transparent and interactive. The student teachers designed these charts to appear within the Minecraft world, seamlessly integrating assessment into the gameplay. The process began with the student teachers incorporating digital progress charts into the lessons. These charts were designed to visually represent a student's progress as different tasks were completed in the game. For instance, if the lesson involved solving a series of puzzles or coding challenges, the chart could update in real-time to show which tasks the student had completed and which

ones still needed attention. This feature provided not only immediate feedback but also the visual demonstration of personal development throughout the lesson, encouraging self-reflection and motivation. Student teachers created these progress charts using Minecraft's in-game tools, such as command blocks and signs, which could be programmed to automatically update as students achieved certain milestones.

Command blocks in Minecraft are beneficial tools that execute various in-game commands automatically when triggered. Command blocks can be used to manipulate the world, control game mechanics, and create complex interactions without manual input. These blocks can summon entities, modify player attributes, manage game rules, and alter the environment by placing or removing

blocks. Additionally, command blocks can teleport players, change weather conditions, set time, and manage inventory items. Beyond basic functions, command blocks support conditional logic, enabling command execution based on specific criteria. Command blocks can also interact with Redstone circuits, enabling automated sequences and chain reactions. In more advanced applications, command blocks can run JSON-formatted commands, display messages, and manipulate scoreboard objectives for tracking player progress. For instance, as students completed a coding task or solved a problem, the chart could reflect their achievements by showing a checkmark or a coloured progress bar. This tracked learning progress of students and provided a visual representation of content advancement.

The effectiveness of using digital progress charts was evident in the engagement of students in the learning process. As students saw their progress reflected in the game, improving motivation for further efforts and development. The progress charts not only provided a sense of accomplishment but also provided the student teachers insight into each student's learning. By tracking how students interacted with the tasks and when difficulties were present, the student teachers could adjust their approach in real-time, offering additional support or challenging students further as needed. Figure 4 demonstrates the use of command blocks within Minecraft Education Edition, specifically showcasing the application in creating interactive assessment tasks. In this example, the command block is configured to detect the presence of a diamond block, triggering an in-game event. Future computer science teachers in this study utilised such command blocks to design digital progress charts and interactive challenges, enabling real-time tracking of student progress and providing immediate feedback. This feature enabled a dynamic and engaging formative assessment approach, where students could visually monitor the achievements and teachers could gather insights into student learning.

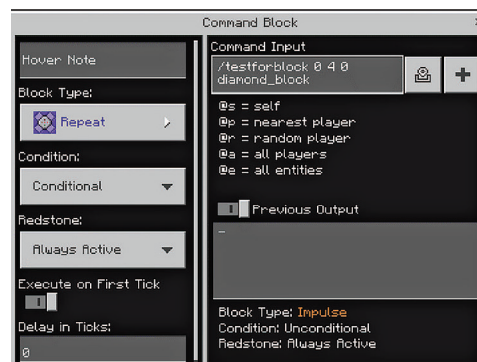


Figure 4. Example of setting up a command block – searching for a diamond block in the Minecraft world
Source: screenshot from Minecraft Education Edition

Incorporating digital progress charts into Minecraft-based lessons demonstrated the student teachers the potential of game-based learning to foster a more personalised and engaging educational environment. The charts were both motivational for students and a valuable resource for the student teachers to assess and refine teaching methods. This experience highlighted the capabilities of integrating formative assessment techniques into interactive learning environments such as Minecraft, rendering the assessment process more dynamic, transparent, and meaningful for both students and teachers.

Table 1 presented the final scores of students from both the experimental and control groups, along with respective rating positions. Students in the experimental group, who were taught using gamified formative assessment with Minecraft Education Edition, generally achieved higher scores than the control group. The sum of ranks for the experimental group is 60, while the control group's sum of ranks is 18. This suggests that students in the experimental group performed better overall compared to those in the control group, indicating a positive effect of the implemented method on student outcomes.

Table 1. Final scores of experiment participants

Student number	Scores in the experimental group	Experimental group (ranks)	Scores in the control group	Control group (ranks)
1	48	12	28	1.5
2	44	10.5	32	3.5
3	40	8	40	8
4	44	10.5	32	3.5
5	36	5.5	2	1.5
6	40	8		
7	36	5.5		
Σ		60		18

Source: original data collected by the authors during the experimental study

The ranks for the experimental and control groups are:
The sample sizes are:

$$\Sigma R_A = 60, \Sigma R_B = 18.$$

The formula for the Mann-Whitney U statistic is:

$$U_A = n_A n_B + \frac{n_A(n_A+1)}{2} - \Sigma R_A. \quad (4)$$

$$U_B = n_A n_B - U_A. \quad (5)$$

Substituting the values:

$$U_A = (7)(5) + \frac{7(8)}{2} - 60 = 35 + 28 - 60 = 3.$$

$$U_B = (7)(5) - 3 = 32.$$

The smaller U value is:

$$U = \min(3.32) = 3.$$

Use of statistical tables or a p-value calculation for the Mann-Whitney U-test:

$$p = 0.0106.$$

For a significance level of $\alpha = 0.05$, since $p < 0.05$, the null hypothesis was rejected.

Since the Mann-Whitney U-test yielded a statistically significant result ($p < 0.05$), the study concluded that the scores in the experimental group were significantly higher than those in the control group. The results should demonstrate a statistically significant difference between the experimental and control groups, with better results in the experimental group. This indicates that the scores in the control group are systematically lower than those in the experimental group. Therefore, the experimental validation of the developed methodology has proven its effectiveness and is recommended for implementation in the educational process.

The boxplot highlights the difference in distributions, showing that the experimental group generally has higher scores. Figure 5 presented a boxplot illustrating the distribution of total scores for both the experimental and control groups. The data, summarised in the accompanying table, reveals a trend: the experimental group's scores are generally higher, with a sum of ranks reaching 60, compared to the control group's sum of ranks at 18. This visual representation highlights the significant difference in performance between the two groups, supporting the conclusion that the Minecraft-based gamified formative assessment had a positive impact on learning outcomes. The following discussion contextualises the empirical results in the existing literature and highlights the practical application. I. Sánchez-López *et al.* (2022) analysed Minecraft: Education Edition as a pioneering example of a digital learning platform within the metaverse. Using a methodology combining Multimodal Discourse Analysis, Grounded Theory,

and the Constant Comparative Method, the study analysed educational potential of Minecraft, emphasising key features such as participant identity, agency, creativity, and the role of community in the learning process. The study highlighted how the platform adapts physical world elements to a connected digital environment, introducing novel aspects such as avatars, multimodal literacy, and game mechanics that foster creativity. The study concluded that Minecraft: Education Edition provides significant benefits for teachers, parents, and administrators, with the educational experience largely dependent on how these stakeholders manage and execute the platform's pedagogical possibilities.

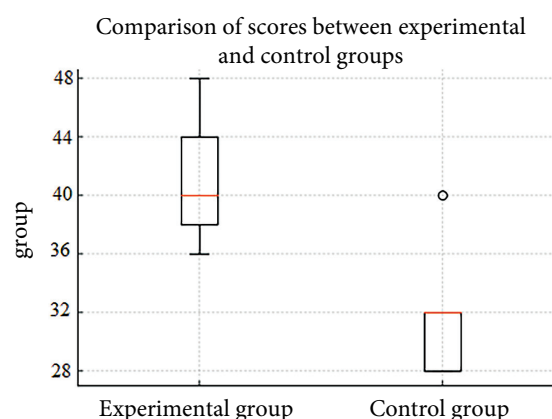


Figure 5. Boxplot with results in the experimental and control groups

Source: developed by the authors based on the study's experimental data

The research by C.I. Helvey *et al.* (2023) explored the potential of games, particularly sandbox games such as Minecraft, for experimental research in human operant behaviour. The study discussed how boredom and subject interest were long-standing challenges in traditional human operant research, where participants may lose motivation due to the repetitive nature of tasks. By incorporating dynamic, game-like experimental paradigms, researchers can minimise attrition and boredom, rendering tasks more engaging and reducing the probability of participants disengaging. Games such as Minecraft, which enable customisation with minimal or no coding requirements, present an accessible solution. These games offer flexible environments for creating controlled yet dynamic experimental tasks, enabling researchers to design experiments that are more engaging for participants.

M.K.A. Sulaiman *et al.* (2024) explored the use of Minecraft Education to teach solar photovoltaic (PV) concepts to secondary school students in Malaysia. The study determined that Minecraft Education significantly enhanced students' comprehension of solar PV technology, improving knowledge retention. The platform proved to be an engaging tool that rendered complex scientific principles more accessible, promoting active participation and critical thinking. The findings support the integration of digital

tools in science education to improve learning outcomes (Sulaiman *et al.*, 2024).

The work by P. Andersen & M. Rustad (2022) analysed the use of Minecraft as an educational tool to support collaborative learning in math classes at the higher education level. The study determined that Minecraft facilitated collaborative learning processes and assisted in development of 21st-century skills in students. By combining social network analysis (SNA) and interaction analysis (IA) as research methodologies, the study demonstrated that Minecraft encouraged collaboration and subject-specific learning. These findings provide valuable insights for creating learning designs that use digital tools to enhance collaborative learning and contribute to the field of computer-supported collaborative learning (CSCL). O. Cóndor-Herrera *et al.* (2021) explored the application of Minecraft Education as a tool for pedagogical teaching. The study highlights how emerging teaching methodologies, such as gamification, are reshaping educational environments by integrating non-traditional elements such as video games. Minecraft Education promotes creativity, collaboration, and problem-solving in a digital, immersive environment, enabling teacher-student engagement on diverse lessons and projects. The study emphasised how this approach, combining gamification with STEM (Science, Technology, Engineering, and Mathematics) learning, enhances student motivation and engagement.

The study by G.K. Ming (2023) explored how Minecraft Education is integrated into teaching through digital game-based learning (DGBL). The study analysed forty lesson plans created for Minecraft Education, emphasising language, topics, skills, and student age. The findings demonstrated how teachers design lessons within the Minecraft Education Framework, aiming to foster creativity, critical thinking, problem-solving, and collaboration. The study highlighted the growing use of Minecraft Education in Malaysia, particularly in subjects such as science, mathematics, social studies, and English, demonstrating its potential to enhance student engagement and skill development. A. Crespo (2021) examined the role of lead users in the development of Minecraft: Education Edition within the game-based learning (GBL) market. The study highlights that teachers, as primary users, were the originators of the game and 90% of the significant, functionally novel innovations within the platform. These findings contrast with the role of producers, who were responsible for 100% of the dimension-of-merit innovations that improve existing user functions. A. Crespo concluded by emphasising the value of lead users in the GBL field and offers suggestions for producers to better support and learn from this vital source of innovation.

N.M. Shamsudin & T.S. Hoon (2024) explored the integration of AI copilot in Minecraft Education Edition to enhance teacher training and pedagogical practices in STEM education. The study addressed how AI copilot tools can support curriculum development, improve classroom management strategies, and engage students in interactive

STEM learning activities. Using a qualitative approach, the research examined the benefits and challenges of AI copilot in teacher training programs, providing insights into its potential to foster collaborative learning environments and optimise STEM education delivery. The findings aim to offer evidence-based recommendations for educational stakeholders seeking to leverage AI to improve teaching and learning outcomes.

Therefore, Minecraft Education provides a rich, multifaceted platform that supports a wide range of subjects and offers both teachers and students a substantial tool for learning. Whether it's solving math puzzles, exploring historical events, or building virtual ecosystems, the game's flexibility and engaging environment, therefore efficient for fostering learning across various disciplines. A. Sortwell & K. Trimble (2015) conducted a systematic review of meta-analyses examining the impact of formative assessment on K-12 students' learning to understand its effectiveness and sustainability. The study reviewed 13 meta-analyses, each on formative assessment in primary and secondary education, utilising systematic literature searches from several key databases. The review found that formative assessment generally produces positive effects on student learning, ranging from trivial to large, with no negative effects identified. However, the effectiveness varied based on the type of assessment used.

Yu. Kulimova (2024) conducted a systematic literature review on formative assessment practices in secondary schools. The study identified three main themes: assessment diversity, assessment strategies, and student learning development. The study emphasised the importance of teacher professional development programs for efficient implementation of formative assessment in classrooms. Such training will help teachers integrate assessment practices to enhance student outcomes in 21st-century education. Z. Zhang & J. Crawford (2024) explored the impact of gamified formative assessment (GFA) on the motivation of EFL learners, using Quizizz as a case study. The study, based on self-determination theory, determined a strong positive correlation between the experimental and control groups' scores across stages, highlighting the role of gamification in enhancing learners' internalisation and engagement. The results demonstrated that the experimental group achieved higher accuracy (89.05%) compared to the control group (74.01%), indicating that GFA boosts motivation, performance, and language proficiency in EFL learners. This research contributes to the literature by emphasising the effectiveness of gamification in fostering student engagement and improving language skills at the elementary level.

In the study by B. Shannaq (2024) presented a model for transforming formative assessment in Omani education, particularly addressing challenges related to cultural hesitancy and low classroom participation. The model integrates digital formative assessment using the Moodle Learning System (MLS), which successfully improved student engagement and performance. The research determined that approximately 90% of students benefited from

this approach, with academic scores increasing by more than 10%. This study highlighted the effectiveness of digital formative assessment in overcoming cultural and participatory barriers, thereby enhancing learning outcomes in educational contexts with limited classroom engagement.

B.B. Ndlovu (2025) explored the role of formative assessment and constructive feedback in enhancing quality education in grade 12 Accounting classes in South Africa's Northern Cape Province. Through qualitative interviews with 15 teachers, the study revealed that teachers are aware of the importance of quality education and formative assessments but emphasise that these assessments should be tailored to address learners' challenges as necessary. The study concluded that teachers should be trained to efficiently provide feedback as part of their teaching practices to improve student performance. Future research should address the effectiveness of feedback and strategies for measuring its impact on learning outcomes. J. Moon *et al.* (2024) investigated the use of multimodal learning analytics as a formative assessment tool in mathematics teacher education. By analysing collaboration of undergraduate students, facial expressions, and emotional data, the study identifies patterns that reveal significant relationships between collaborative discourse, emotional indicators, and lesson performance. The results demonstrated that multimodal data can effectively predict learning outcomes and provide deeper insights into the learning process. This approach offered promising implications for math education, though the study also highlights its limitations and suggests future research avenues to further refine this method.

Authors J.F.P. Luzano *et al.* (2024) explored the use of Symbolab and Photomath applications as formative assessment tools in calculus studies at Bukidnon State University. Through interviews, observations, and document analysis, the study identified four key themes: learning support in mathematics, ethical use of math applications, user-friendly features, and accessibility and inclusivity. The findings suggested that these applications enhance students' learning experiences and provide teachers with valuable tools to improve calculus instruction. The study recommended that both students and teachers actively utilise these applications to deepen the expertise and awareness in the subject. C. Li *et al.* (2024) conducted a scoping review to investigate the use of gamified formative assessment (GFA) in supporting English language learning for school-aged students. The review analysed 30 articles (35 interventions) published between 2016 and 2023, determining that points and leaderboards were the most common gamification elements, and immediate, simple written feedback was the primary form of feedback. The study revealed that GFA, particularly through quizzes, significantly enhances students' academic performance in English proficiency, vocabulary, and grammar, as well as boosts their motivation, satisfaction, and engagement. However, the review highlights the need for more theory-driven, methodologically rigorous studies to expand the comprehension of GFA's impact on young learners.

S. Tirado-Olivares *et al.* (2024) investigated the use of learning analytics (LA) in primary education to enhance historical thinking. The study, involving 76 elementary students (ages 10-12), explored the impact of LA on academic achievement and self-efficacy. The findings revealed that LA particularly benefitted students with low historical knowledge, enabling the prediction of academic performance, especially in historical thinking. The study also identified a gap between students' perceived abilities and actual performance, suggesting the need for formative tasks that help students recognise limitations and misconceptions before exams. The results indicate that LA can be a valuable tool for formative assessment in history education.

The discussion of the reviewed literature underscored that Minecraft Education is a multifaceted and engaging platform supporting a wide range of subjects, offering both teachers and students a powerful learning tool. Studies consistently demonstrate its effectiveness in enhancing student engagement and knowledge retention. Furthermore, research on formative assessment emphasises positive impact on learning outcomes, with gamified approaches and digital tools such as AI copilots, learning analytics, and mobile applications proving particularly effective in boosting student motivation and performance. These studies highlight the importance of integrating digital technologies and innovative assessment strategies to improve educational practices and address contemporary learning challenges. In summary, the study demonstrated that Minecraft Education Edition significantly improved student engagement and performance in the experimental group compared to traditional methods. The results highlight the effectiveness of gamified formative assessment tools in enhancing learning. These findings suggest that game-based learning can foster more dynamic and effective educational experiences. Future research could explore the long-term impact of these methods.

CONCLUSIONS

The study highlighted the potential of gamification and formative assessment in improving informatics education for primary school students. By integrating Minecraft Education as an interactive learning tool, student-teachers were able to create engaging lessons that encouraged problem-solving, creativity, and motivation among young learners. The findings demonstrated that well-structured gamified formative assessments, such as NPC-based feedback systems and digital progress charts, not only enhance students' comprehension of key concepts but also rendered the learning process more dynamic and student-centred. Moreover, the experiment confirmed that future computer science teachers greatly benefit from hands-on experience in designing and implementing gamified lessons. Teachers not only gained technical proficiency in using Minecraft as a teaching tool but also developed essential pedagogical skills, such as fostering student engagement, adapting formative assessment strategies, and promoting a creative approach to instruction. The statistically significant results

from the study suggested that incorporation of such digital tools in teacher training programs could positively influence the way informatics is taught in primary schools.

Given the success of this approach, it would be beneficial to integrate more game-based learning strategies into teacher training curricula. Future educators should be encouraged to experiment with digital tools such as Minecraft to create interactive, student-centred learning environments. Universities and educational institutions should offer specialised courses that emphasise the use of gamification in formative assessment, ensuring that student-teachers develop the necessary skills to implement these methods effectively in real classrooms. Additionally, school administrators and policymakers should consider providing teachers with access to educational versions of popular digital tools, along with training on integration into the curriculum. Teachers should also be given

opportunities to collaborate and share best practices, ensuring that gamification is not just an occasional classroom experiment but a well-supported instructional approach.

Future studies could conduct longitudinal analyses to assess the sustained impact of gamified formative assessments and explore the application of these methodologies across diverse digital platforms, thereby optimising the integration of 21st-century skills into primary education.

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REFERENCES

- [1] Andersen, R., & Rustad, M. (2022). Using Minecraft as an educational tool for supporting collaboration as a 21st century skill. *Computers and Education Open*, 3, article number 100094. doi: 10.1016/j.caeo.2022.100094.
- [2] Bourdeau, S., Coulon, T., & Petit, M.C. (2021). Simulation-based training via a "Readymade" virtual world platform: Teaching and learning with Minecraft education. *IT Professional*, 23(2), 33-39. doi: 10.1109/MITP.2021.3062935.
- [3] Córdor-Herrera, O., Acosta-Rodas, P., & Ramos, C. (2021). Applying minecraft education to pedagogical teaching. In *Proceedings of the human systems engineering and design (IHSED2021): Future trends and applications* (pp. 23-25). Louisville: AHFE International. doi: 10.54941/ahfe1001101.
- [4] Crespo, A. (2021). *Innovations in game-based learning: How lead users created Minecraft: Education edition*. (Doctoral dissertation, Massachusetts Institute of Technology, Cambridge, USA).
- [5] Ethical Guidelines for Educational Research. (2018). Retrieved from <https://www.bera.ac.uk/publication/ethical-guidelines-for-educational-research-2018>.
- [6] Helvey, C.I., Gates, L., Rountree, P., & Cariveau, T. (2023). Gamified human operant research: A brief introduction to Minecraft education. *Experimental Analysis of Human Behavior*, 34(1), 1-8. doi: 10.17605/OSF.IO/VT58F.
- [7] Klimová, N., Šajben, J., & Lovászová, G. (2021). Online game-based learning through Minecraft: Education edition programming contest. In *2021 IEEE global engineering education conference (EDUCON)* (pp. 1660-1668). Vienna: IEEE. doi: 10.1109/EDUCON46332.2021.9453953.
- [8] Kulimova, Yu. (2024). Improving the speech-communicative competence of future elementary school teachers in the context of digitalisation the higher pedagogical education in Ukraine. *Pedagogical Sciences*, 27(2), 24-33. doi: 10.33989/2524-2474.2024.2.24.
- [9] Li, C., Fryer, L.K., & Chu, S.K. (2024). Utilising gamified formative assessment to support English language learning in schools: A scoping review. *Innovation in Language Learning and Teaching*, 19(2), 188-204. doi: 10.1080/17501229.2024.2352789.
- [10] Luzano, J.F.P., Nallada, J.G., Hulagpos, D.R.B., & Damasco, J.J.R.C. (2024). Unveiling the power of educational mathematics applications as formative assessment tools: A multiple case study. *International Journal of Research in STEM Education*, 6(1), 15-35. doi: 10.33830/ijrse.v6i1.1657.
- [11] Ming, G.K. (2023). Constructing meaningful learning with Minecraft education: An analysis of game-based lessons. *Asian Journal of Research in Education and Social Sciences*, 5(2), 45-52. doi: 10.55057/ajress.2023.5.2.5.
- [12] Moon, J., Yeo, S., Banihashem, S.K., & Noroozi, O. (2024). Using multimodal learning analytics as a formative assessment tool: Exploring collaborative dynamics in mathematics teacher education. *Journal of Computer Assisted Learning*, 40(6), 2753-2771. doi: 10.1111/jcal.13028.
- [13] Ndlovu, B.B. (2025). Exploring teachers' practices when using formative assessment in improving quality education. *Cogent Education*, 12(1), article number 2451489. doi: 10.1080/2331186X.2025.2451489.
- [14] Nkadimeng, M., & Ankiewicz, P. (2022). The affordances of minecraft education as a game-based learning tool for atomic structure in junior high school science education. *Journal of Science Education and Technology*, 31(5), 605-620. doi: 10.1007/s10956-022-09981-0.
- [15] Sánchez-López, I., Roig-Vila, R., & Pérez-Rodríguez, A. (2022). Metaverse and education: The pioneering case of Minecraft in immersive digital learning. *Information Professional*, 31(6), article number e310610. doi: 10.3145/epi.2022.nov.10.

- [16] Shamsudin, N.M., & Hoon, T.S. (2024). The use of AI copilot in Minecraft education edition for teacher training: Enhancing pedagogical practices and STEM learning. In *International conference on innovation & entrepreneurship in computing, engineering & science education (InvENT 2024)* (pp. 525-531). Shah Alam: Atlantis Press. [doi: 10.2991/978-94-6463-589-8_49](https://doi.org/10.2991/978-94-6463-589-8_49).
- [17] Shannaq, B. (2024). Digital formative assessment as a transformative educational technology. In *Future of information and communication conference* (pp. 471-481). Cham: Springer Nature Switzerland. [doi: 10.1007/978-3-031-54053-0_32](https://doi.org/10.1007/978-3-031-54053-0_32).
- [18] Singh, M., & Sun, D. (2025). Evaluating Minecraft as a game-based metaverse platform: Exploring gaming experience, social presence, and STEM outcomes. *Interactive Learning Environments*, 1-23. [doi: 10.1080/10494820.2025.2459200](https://doi.org/10.1080/10494820.2025.2459200).
- [19] Slattery, E.J., Butler, D., O'Leary, M., & Marshall, K. (2023). Primary school students' experiences using Minecraft Education during a national project-based initiative: An Irish study. *TechTrends*. [doi: 10.1007/s11528-023-00851-z](https://doi.org/10.1007/s11528-023-00851-z).
- [20] Slattery, E.J., Butler, D., O'Leary, M., & Marshall, K. (2024). Teachers' experiences of using Minecraft Education in primary school: An Irish perspective. *Irish Educational Studies*, 43(4), 965-984. [doi: 10.1080/03323315.2023.2185276](https://doi.org/10.1080/03323315.2023.2185276).
- [21] Sortwell, A., & Trimble, K. (2015). *Embedding formative assessment: Practical techniques for K-12 classrooms*. Blairsville: Learning Sciences International.
- [22] Sulaiman, M.K.A., Yasin, R.M., Halim, L., Arsad, N.M., & Samsudin, M.A. (2024). Empowering the next generation: Using Minecraft education to teach solar photovoltaic concepts in secondary school. *International Journal of Information and Education Technology*, 14(7), 976-987. [doi: 10.18178/ijiet.2024.14.7.2125](https://doi.org/10.18178/ijiet.2024.14.7.2125).
- [23] Tablatin, C.L.S., Casano, J.D., & Rodrigo, M.M.T. (2023). Using Minecraft to cultivate student interest in STEM. *Frontiers in Education*, 8, article number 1127984. [doi: 10.3389/feduc.2023.1127984](https://doi.org/10.3389/feduc.2023.1127984).
- [24] Tirado-Olivares, S., López-Fernández, C., González-Calero, J.A., & Cózar-Gutiérrez, R. (2024). Enhancing historical thinking through learning analytics in primary education: A bridge to formative assessment. *Education and Information Technologies*, 29, 14789-14813. [doi: 10.1007/s10639-023-12425-w](https://doi.org/10.1007/s10639-023-12425-w).
- [25] Zhang, Z., & Crawford, J. (2024). EFL learners' motivation in a gamified formative assessment: The case of quizizz. *Education and Information Technologies*, 29, 6217-6239. [doi: 10.1007/s10639-023-12034-7](https://doi.org/10.1007/s10639-023-12034-7).

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Гейміфікація формуального оцінювання в початковій школі через розробку та впровадження курсів із використанням Minecraft майбутніми вчителями інформатики

Анотація. Гейміфікація та формувальне оцінювання привертають дедалі більшу увагу в освіті як ефективні стратегії підвищення залученості студентів та покращення результатів навчання. Метою дослідження було визначити, як такий підхід впливає на мотивацію студентів, розуміння ключових понять інформатики та розвиток цифрових компетентностей у майбутніх педагогів. У дослідженні брали участь майбутні вчителі інформатики, які розробляли та впроваджували інтерактивні уроки з використанням Minecraft для полегшення навчання та оцінювання прогресу учнів. Це дослідження вивчало ефективність використання Minecraft Education як гейміфікованого інструменту для формуального оцінювання в інформатичній освіті в початковій школі. Результати показали, що інтеграція гейміфікованого формуального оцінювання значно підвищила зацікавленість, залученість та розуміння учнів. Майбутні вчителі також отримали цінний досвід у розробці навчальної діяльності, орієнтованої на учня, з використанням Minecraft, продемонструвавши вдосконалення педагогічних навичок та ефективне використання цифрових інструментів. Результати показали, що студенти продемонстрували підвищену зацікавленість, залученість та розуміння, коли формувальне оцінювання було інтегровано в гейміфіковане середовище. Крім того, майбутні вчителі отримали цінний досвід у розробці навчальної діяльності, орієнтованої на учня, розвитку креативності та ефективному використанні цифрових інструментів. Статистичний аналіз підтвердив позитивний вплив гейміфікованого формуального оцінювання на результати навчання. Це дослідження свідчить про те, що включення стратегій навчання на основі цифрових ігор у програми підготовки вчителів може значно покращити педагогічні навички та здатність створювати інтерактивний навчальний досвід. У дослідженні зроблено висновок, що гейміфікація може слугувати інноваційним та ефективним підходом до формуального оцінювання в інформатичній освіті, надаючи студентам негайний зворотній зв'язок, зберігаючи при цьому їхню мотивацію. Результати дослідження мають практичне значення для вчителів початкової школи, викладачів інформатики та розробників навчальних програм, які прагнуть інтегрувати гейміфіковані підходи в навчальний процес. Вони пропонують практичні поради щодо використання Minecraft Education для формуального оцінювання, що може підвищити залученість учнів та покращити результати навчання.

Ключові слова: цифрове навчання; підготовка вчителів; інтерактивне навчання; залучення учнів; освітні технології

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Abstract. This study aimed to uncover how educators conceptualise, implement, and reflect on play-based pedagogical practices within the context of creative arts instruction. Employing a qualitative, phenomenological methodology, the research involved semi-structured interviews with seven early childhood educators conducted over five weeks. Data were analysed using interpretative phenomenological analysis and supported by reflexive journaling to capture the depth of the participants' experiences. This study explored the integration of play-based learning in early childhood creative arts education, focusing on its impact on cognitive flexibility, problem solving, and creative self-expression. The results indicated that play-based strategies significantly foster young learners' artistic expression and cognitive development. Educators reported adapting structured curricula to include open-ended and exploratory activities that promote student agency and engagement. Despite these benefits, participants identified several barriers to effective implementation, including rigid institutional schedules, limited access to materials, and inadequate opportunities for professional development. This study highlighted the importance of aligning pedagogical practices with developmental needs through flexible and play-centred approaches. It also emphasised the necessity of systemic support, including targeted teacher training and policy adjustments, to overcome practical constraints. These findings contribute to the discourse on early childhood education by offering actionable insights into the effective integration of play-based learning into creative arts curricula. This research calls for a re-evaluation of current educational frameworks to better support innovative, child-centred teaching methodologies that align with contemporary understandings of early learning and development

Keywords: artistic integration; arts curriculum; cognitive enhancement; play-based learning; international teaching practices; early childhood education; pedagogical innovation

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INTRODUCTION

This study holds significant importance as it explores the teaching of young children through creative arts, the study illustrated the delicate balance educators must maintain

between structure and freedom. During the early years, when children are highly receptive and absorb everything around them, integrating play into education can great-



ly enhance their cognitive, social, and emotional development. This research draws on the renowned theories M. Montessori, J. Piaget and J. Dewey, demonstrating how play not only makes learning enjoyable but also profoundly enriching. It emphasises the necessity of providing teachers with the appropriate training and support to implement these playful methods in classrooms, despite obstacles such as tight schedules and limited resources. Furthermore, it discusses the exciting potential of digital tools to foster creativity while preserving the hands-on experiences crucial for young learners. This research offers valuable insights for those involved in shaping the future of early childhood education, ensuring that children's creativity and development are nurtured in meaningful ways.

The metaphor of dance in pedagogy effectively encapsulates the fluid, dynamic, and expressive nature of teaching and learning within early childhood creative arts education. Much like dance – which merges movement, rhythm, and emotional expression – educators in early childhood settings choreograph learning experiences that interweave play, creativity, and artistic development. As M. Garaigordobil *et al.* (2022) and M.C. Ekeh (2023a) argued, such integration is particularly vital during the formative years, when cognitive, social, and emotional development is deeply interconnected with engagement in creative practices. The value of creative arts education for young children is widely supported in the literature; L. Brovchak *et al.* (2024), for instance, demonstrated its beneficial influence on cognitive flexibility, problem-solving abilities, and emotional intelligence. Furthermore, contemporary research underscores the efficacy of play-based approaches in enhancing learning outcomes, social competence, and creative expression in early childhood arts education. Nonetheless, as these scholars suggested, the successful application of such approaches within formal educational frameworks demands careful attention to pedagogical strategies and the development of teacher expertise.

Integrating play-based approaches into creative arts education introduces a complex interplay of opportunities and challenges for early childhood educators. E. Halverson & K. Sawyer (2022) and K. Peppler *et al.* (2022) noted that traditional educational paradigms often prioritise structured learning outcomes, which can conflict with the inherently spontaneous and exploratory nature of artistic expression through play. This tension becomes particularly pronounced in early childhood contexts, where educators must navigate curricular demands while adhering to developmentally appropriate practices. According to K. Rathunde & R. Isabella (2020) and B. Švábová & E. Dolinská (2024), the successful implementation of play in art education depends on intentional planning, a solid grounding in theory, and strong practical teaching skills. Despite these insights, there remains a notable gap in the literature regarding how educators conceptualise and integrate these methods in everyday practice. Given the dynamic character of creative arts education and the diverse developmental needs of young children, B. Miseliūnaitė *et*

al. (2022) and H. Catalano *et al.* (2023) argued for a more nuanced understanding of effective pedagogical strategies, especially as education systems increasingly adopt holistic and child-centred approaches.

Contemporary discourse in early childhood education increasingly highlights the value of play-based learning across all developmental domains, including creative arts education, as argued by M.S. Dewi & Yufiarti (2021). Their work underscores the role of play as a primary medium through which young children explore, express themselves, and make sense of their environment. Despite this recognition, B. Lee *et al.* (2015) pointed out that the practical implementation of play-based approaches within creative arts education varies widely across different educational settings. While some institutions effectively embed play into their arts curricula, others encounter significant challenges, including structural limitations, lack of resources, or gaps in pedagogical expertise. J. Prins *et al.* (2022) further suggested that such discrepancies in practice prompt critical reflection on the underlying factors influencing successful implementation, including the specific methodological strategies employed by educators. Gaining a deeper understanding of these contextual differences is essential for informing the design of robust professional development initiatives and support systems tailored to the needs of early childhood educators.

This study aimed to bridge the gap between theoretical frameworks and classroom practices in early childhood creative arts education by investigating how educators integrate play-based methodologies. Grounded in the lived experiences of teachers, it seeks to provide actionable insights into the alignment of pedagogical theory with practical implementation. Specific objectives:

1. To examine how early childhood educators conceptualise play-based learning in creative arts instruction, including their philosophical and pedagogical motivations.
2. To identify and analyse the practical strategies and methodological approaches teachers employ to integrate play into creative arts lessons.
3. To evaluate the challenges and opportunities teachers encounter in operationalising play-based art education, including institutional, resource-related, and pedagogical barriers.

MATERIALS AND METHODS

This phenomenological study utilised qualitative research methods to investigate the lived experiences of early childhood educators as they integrated play into creative arts education across various early childhood learning centres in Owerri municipal. The researchers employed purposive sampling to recruit 7 early childhood practitioners to ensure the selection of relevant cases; hence, the total number of sample participants is seven. The selection criteria emphasised educators with documented and sustained engagement in play-based learning approaches, as evidenced by their teaching portfolios, peer recommendations, and participation in professional development programs

focused on child-centred pedagogy. This strategic sampling approach ensured that the participants possessed both the experiential depth and reflective capacity necessary for phenomenological enquiry.

Data were collected through in-depth, semi-structured interviews, each lasting approximately 45 minutes. The interviews were scheduled over a five-week period from October to November 2024 to accommodate the participants' teaching responsibilities and foster rapport and trust. Participants, aged between 30 and 55 years, were interviewed during non-instructional hours in quiet, distraction-free settings on school premises. During non-instructional hours, sessions were held in quiet, distraction-free settings on school premises. The semi-structured format allowed for open-ended dialogue, enabling the participants to articulate their experiences, challenges, and pedagogical intentions in their own words. This approach facilitated the elicitation of rich narrative data that captured the complexity of their professional realities.

The analysis followed the principles of Interpretive Phenomenological Analysis (IPA), which involved multiple readings of the interview transcripts to identify significant statements, emergent themes, and underlying meanings. The researchers engaged in iterative coding and thematic clustering, allowing for the emergence of patterns related to pedagogical decision-making, negotiation of institutional expectations, and embodiment of play-oriented teaching philosophies. To enhance the credibility and trustworthiness of the findings, the research process incorporated peer debriefing sessions with fellow qualitative researchers and maintained a reflexive journal to document the researchers' evolving interpretations and positionalities throughout the study.

Ethical approval for this study was granted by the Faculty of Specialized Education at Alvan Ikoku Federal University of Education (Ref: FSE-EC 2024/45). All participants provided informed consent through culturally sensitive procedures that acknowledged local norms and the communication styles. Participants were thoroughly briefed on the study's aims, their rights as research subjects, and the voluntary nature of their involvement, including the option to withdraw at any stage, without penalty.

The phenomenological design was particularly well-suited to uncovering the often implicit and intuitive teaching philosophies that guide educators' integration of play into creative arts curricula. The extended interview period allowed for the development of trust and the collection of layered and contextually grounded insights. This methodological alignment was essential for capturing what the researchers conceptualised as "the dance of pedagogy", a metaphor that encapsulates the fluid, responsive, and embodied nature of teaching practices that blend structure with spontaneity, especially in play-based learning environments.

RESULTS AND DISCUSSION

This section comprehensively analysed the findings from semi-structured interviews with early childhood educators

regarding play-based learning in creative arts education. The study explores the implementation of play-based approaches, the role of professional development, challenges faced by educators, and the potential of technology integration. The findings highlight the importance of balancing structured guidance with creative freedom, supported by J. Dewey's (1938) experiential learning theory. The section delves into participants' experiences, institutional barriers, and innovative strategies for enhancing creative arts education in early childhood settings.

Responding to the research questions via the semi-structured interview, participant 1 added, "To me, play-based learning is using activities that allow children to explore their creativity in a fun, engaging way. I learned that through firsthand experience engaging with children in the classroom, as well as through their exploration of various materials. This isn't just about learning techniques; it's about allowing children to express their ideas freely through art". Similarly, participant 2 noted: "Through creative arts, play is knowing as you do – paint, dance, craft. It aids in developing their cognitive and motor skills and allows them to glorify their emotional expression as well. I learned this method at workshop training and observed how kids thrive creatively when they are not put in a box of rules".

Referring to art as not needing to learn techniques but instead just participating through play to express themselves. The authors M. Ekeh (2023b) and L. Brovchak *et al.* (2024) contended that through play-based learning, early childhood educators can intentionally promote cognitive and artistic growth, an echo of that sentiment lives within the manuscript. Participant 7 confirmed this perspective, stating: "Open-ended questions I often use ie creativity prompt. So I would like to ask, "What colours do you think would be good for the painting? This gives them the space to consider their options and choose. I also incorporate music and movement into my teaching strategy to open up the door to expression in art".

This suggests that play is a significant vehicle for creative expression. This idea is also supported in the literature on J. Dewey's experiential learning model, whereby children access higher cognitive and creative capacities through guided playful interactions (Luo, 2024). Like much of the addition of play in education, the dance of structure and free expression is essential in its integration. As Participant 2 commented: "I offer a framework. For example, I'll have a theme for the day – such as nature or animals. but allow children to interpret it however they want. The structure is already given in the prompt or materials (what kind of poem it is, for example), but it's up to them how they express what the theme is and how it relates to their own lives".

This aligns with the "dance of pedagogy" notion in the manuscript, in which teachers balance structured guidance with creative freedom to support deeper engagement (Halverson & Sawyer, 2022). In line with this, Participant 3 added: "I create defined goals but keep the path to achieve them uncertain. So, for example, I might say to the children, "Come and make a picture to show me your

family”, but how they do that, whether it’s drawing or collage or sculpture, is their choice”.

This resonates with J. Dewey’s experiential learning theory, which proposes that firm goals can exist alongside the adaptability required for artistic exploration (Luo, 2024). These two angles are intrinsic to building discipline balance against the flare of creativity, especially in early childhood education (Peppler *et al.*, 2022). Focus on effective play-based art instruction: Professional development in education is key to helping educators hone in on effective play-based art instruction. Participant 3 stated, “About a few years ago, I attended a professional development workshop on play-based learning concepts. It had an emphasis on incorporating play in the early childhood decades. This very much shifted how I view creative arts in the classroom. I also learned a lot from my years teaching, where I knew how kids engage with art materials and how they learn best in a playful setup”.

Endorsing this firsthand experience, the authors also noted that teacher training helps bridge theory and practice, allowing educators to use innovative methodologies (Ata-Akturk & Sevimli-Celik, 2020). Participant 4 also commented, “Both my early childhood education degree and my creative arts pedagogy degree centred on child-centred learning. I have encountered many different teaching methods throughout my studies, and the different perspectives I had greatly affected the way I utilise play. Storytelling and drama (which I had learned in training) are two ways I build creativity into art lessons”.

Demonstrating how a structured training program can widen teaching approaches. This is in accordance with recent studies that suggest that intense pre-service training is critical to breaking down limiting beliefs and building self-efficacy in visual arts teaching (Lindsay, 2020). Interviews revealed institutional barriers and resource limitations as key struggles. Participant 6 said, “The major issue is time. The curriculum is so jam-packed that there isn’t always time to devote to play-based learning. Sometimes I need to rush through creative lessons, which isn’t always ideal for developing deep artistic expression”. He explains the tension between scheduled curricular demands and the need for playful exploration. Another challenge is inadequate resources, as Participant 7 noted: “With art materials in limited supply or being costly, I have to be inventive with what I use. And sometimes the children’s creative potential limits what they can access”, noting that physical constraints can limit creative expression.

Additionally, “There’s also a lack of teacher training on play-based learning specifically.” Participant 2 noted: “I learned a lot on my own but there’s not such structured support and resources from the government to implement this and scale the ideas I have in here”. These perspectives reflect literature that criticises conventional educational paradigms for not valuing play-based learning and demands the implementation of more helpful institutional policies and resource allocation to encourage ongoing artistic enquiry (Cheung, 2012; Lee *et al.*, 2015; Miseliūnaitė *et al.*, 2022).

Participants also emphasised the potential of technology to enhance creative arts education. Participant 4 described: “I believe that there’s a great deal of potential that comes with integrating technology. There are apps and online tool/platforms that can engage children with creating arts digitally. By introducing these tools in a playful, guided way, it could further refine the creative experience”.

Participant 2 added: “I have considered using digital storytelling apps where children can create their own story and illustrations. These tools are a new way for kids to play and learn, combining creativity with technology”. Participant 3 mentioned: “I’ve used music apps that let kids create their own little tunes and rhythms, which is fun and educational. This kind of technological integration exists that creates new opportunities for creative expression”. These new strategies align with the more recent literature, which reflects how digital media expands beyond traditional art encounters to new multi-modalities (Hua & Yu, 2024). However, this does not mean that they advocate for the complete abolishment of traditional media; instead, they prescribe the careful implementation of technology to connect creative practice across disciplines and perspectives, opening the door for a more integrated experience through education.

Particularly salient in this discussion is the role of well-established theoretical foundations in informing play-based creative arts pedagogies. The study draws upon J. Dewey’s experiential learning model to elucidate how guided play serves as a vehicle for developing higher-order cognitive skills (Luo, 2024). Although the manuscript presents these theoretical elements effectively, deeper integration and analysis of their observable classroom applications remain areas for further exploration (Creaghe & Kidd, 2022; Vasiuk & Vyhovska, 2023).

These findings underscore the critical influence of teacher training and professional development in shaping practical play-based learning experiences in creative arts education. Participants’ narratives highlighted that structured professional learning opportunities empower educators to skillfully balance the safe structure of thematic lessons with the necessary creative freedom (Ata-Akturk & Sevimli-Celik, 2020). Investing in pre-service and in-service training facilitates the merging of academic theories with practical strategies, enabling teachers to foster environments that support comprehensive cognitive and artistic growth (Lindsay, 2020).

A significant challenge identified in this study is the restrictive nature of institutional structures, particularly limited resources and inflexible schedules that constrain play-based practices. Participants noted that rigid curricular requirements often contradict the organic and spontaneous essence of playful learning, leading to missed opportunities for holistic creative expression. Academic literature further critiques traditional educational paradigms for undervaluing creative exploration and advocates for more adaptable institutional policies and improved resource allocation (Cheung, 2012; Lee *et al.*, 2015; Miseliūnaitė *et al.*, 2022).

Equally noteworthy is the cautious yet optimistic stance on integrating digital technology into creative arts education. Educators acknowledge that digital tools can significantly enhance artistic expression and creativity when employed as a complement to traditional hands-on experiences. However, it remains essential to strike a balance so that these technologies supplement, rather than replace, tactile learning approaches. This careful integration can open new multimodal avenues for creativity that align with current trends in art education innovation (Hua & Yu, 2024).

This study provided rich insights into the application and challenges of play-based learning in early years creative arts education. The findings underscored the importance of integrating structured guidance and free expression, as illustrated by participants' successful balancing of predetermined themes with open-ended exploration. The authors found that the conceptual framework of J. Dewey's experiential learning theory forms the backbone of this approach, ultimately supporting both cognitive and artistic growth, as observed in participants' narratives (Ekeh, 2023b; Brovchak *et al.*, 2024). In summary, this study focused on the paradoxes and realities faced by teachers who aim to incorporate play within creative arts education and the solutions that may assist them. Although the latter is relatively simple, this study explores in detail how teachers apply research to understand how to teach effectively in early childhood.

Given the critical role of professional development, educational institutions and policymakers must invest in comprehensive training programs. The authors recommend enriching pre-service and in-service training curricula with modules on play-based learning and creative arts pedagogy. Workshops, mentoring relationships, and collaborative professional learning communities can enable teachers to bridge the gap between theory and practice, ultimately empowering them to balance structure and creative autonomy in their classrooms (Ata-Akturk & Sevimli-Celik, 2020; Lindsay, 2020).

The study identified time constraints and inadequate resources as significant barriers to effective play-based learning. The authors suggest that educational policymakers reframe institutional support systems to provide more flexible schedules and increased resource allocation to address these challenges. Curriculum planners must incorporate designated periods for creative enquiry and authentic play, thereby reducing the conflict between rigid curricular demands and the spontaneous nature of art. Enhanced support mechanisms, including regular funding for art materials and teacher-training programs, are crucial for overcoming these systemic impediments (Cheung, 2012; Lee *et al.*, 2015).

Participants also highlighted the promising potential of digital technology for enriching creative arts education. The authors recommend a balanced approach in which digital tools serve as a complement to traditional tactile experiences rather than as a replacement. Integrating digital platforms for activities such as digital storytelling or virtual art exploration can broaden children's creative horizons. However, it is important to maintain the integrity

of hands-on learning; thus, any technological integration should be strategically planned to sustain the experiential quality that is central to effective creative arts instruction (Hua & Yu, 2024).

This literature review was grounded in the foundational theory of J. Dewey's experiential learning model, which frames artistic play as a dynamic process of meaning-making and skill development (Luo, 2024). The review further explored how teachers conceptualise play in creative arts settings, revealing how professional experiences, cultural contexts, and pre-service training shape pedagogical practices (Ata-Akturk & Sevimli-Celik, 2020; Ekeh, 2023a). In addition, it examined implementation practices that balance structured and unstructured activities to foster holistic creative expression (Hooshyari *et al.*, 2023; Brovchak *et al.*, 2024) and considers innovative methodological approaches, including project-based learning and the thoughtful integration of digital tools to expand artistic opportunities (Catalano *et al.*, 2023; Hua & Yu, 2024). These discussions provided a comprehensive framework for understanding and advancing play-based approaches to early childhood arts education.

The intersection of play-based learning and arts education is grounded in several complementary theoretical frameworks that illuminate our understanding of how children develop artistic capabilities. J. Dewey's experiential learning theory emphasised learning through direct experience, particularly relevant to arts education. J. Dewey's (1938) work highlighted the importance of hands-on exploration and discovery in learning processes. His foundational text, is a key reference for understanding his approach to experiential learning (Luo, 2024). Recent research highlighted the significant role of experiential learning through artistic play in supporting cognitive development and enhancing creative expression. For instance, creative activities such as music, art, and storytelling significantly enhance children's cognitive and imaginative skills, including originality, fluency, and flexibility (Aulakh *et al.*, 2024).

The theoretical landscape has been further enriched by sociocultural perspectives that emphasise the role of cultural context in artistic play (Creaghe & Kidd, 2022). Children's artistic expression through play is deeply influenced by their cultural backgrounds and community values. This understanding has led to more culturally responsive approaches to early childhood arts education (Göthberg *et al.*, 2018). Teachers' understanding of play in creative arts education is shaped by their professional experience, cultural background, and institutional context. This understanding is crucial for fostering creativity and engagement in educational settings (Dewi & Yufiarti, 2021). Educators recognise the importance of creative play, which is influenced by pedagogic culture, including space, interpersonal collaborations, and materials. These elements collectively shape the manifestation and perception of creative play is manifested and perceived in early childhood settings (Prins *et al.*, 2022; Ekeh, 2023a).

Research on pedagogical beliefs in arts education reveals distinctive patterns in teachers' approaches to artistic play. Several studies have highlighted the influence of educators' self-efficacy beliefs and pedagogical knowledge on their teaching methods in the arts. For instance, early childhood educators' visual arts self-efficacy beliefs significantly impact their pedagogical choices, often limiting children's access to visual arts due to educators' lack of confidence and skills. This limitation is compounded by insufficient pre-service training, which fails to disrupt these limiting beliefs and enhance educators' visual arts skills and knowledge (Lindsay, 2020). Early childhood educators' beliefs about child development significantly influence their facilitation of artistic experiences. These beliefs range from prioritising structured guidance to emphasising child-led exploration, impacting how art is integrated into early childhood education.

Educators' self-efficacy in the visual arts, often shaped by their childhood experiences and insufficient pre-service training, affects their ability to support children's artistic learning. This can lead to a restricted visual arts curriculum unless these beliefs are challenged and expanded through constructivist approaches and practical skills development (Lindsay, 2020). Teachers' beliefs about creativity and good creative practices often align with the literature, but may not always translate into classroom practices. These practices are influenced by various factors beyond personal beliefs, such as environmental settings and teaching strategies (Cheung, 2012; Ata-Akturk & Sevimli-Celik, 2020). Programs involving co-mentoring between educators and artists can enhance engagement with the arts and positively change pedagogy. Such initiatives emphasise the importance of reflection, planning, and understanding the capabilities of young children (Hayes *et al.*, 2021).

The interplay between structured and unstructured play in art education offers unique opportunities for artistic development. Structured play often involves organised activities with specific goals, whereas unstructured play allows for more freedom and creativity, both of which are essential for fostering artistic skills and cognitive development. Structured activities provide foundational skills and techniques, whereas unstructured play fosters creative exploration and personal expression. Successful programs typically incorporate both approaches to maximise learning outcomes (Hooshyari *et al.*, 2023).

The integration of different art forms demands thoughtful consideration of cross-disciplinary connections between them. Visual arts, music, drama, and dance offer unique opportunities for expression and learning (Dewi & Yufiarti, 2021). When intentionally combined, these diverse artistic modalities create rich multisensory experiences that enhance children's artistic understanding and creative capabilities (Brovchak *et al.*, 2024). The physical environment plays a crucial role in supporting artistic explorations. Thoughtfully designed spaces and carefully selected materials encourage sustained engagement in artistic processes (Ekeh, 2023b). Time management and

scheduling considerations affect the quality of the artistic engagement. Flexible scheduling approaches that allow for extended exploration periods often yield more meaningful artistic experiences. Contemporary approaches to play-based arts education emphasise the importance of balanced pedagogical strategies that respond to children's needs and interests. Child-centred and teacher-guided approaches offer distinct benefits, with successful programs often blending both methodologies to create optimal learning environments (Garaigordobil *et al.*, 2022; Catalano *et al.*, 2023).

Project-based learning and emergent curriculum approaches provide frameworks for sustained artistic exploration. These methodologies allow children to investigate artistic concepts in depth while following their natural curiosities and interests. Long-term projects enable the development of complex artistic understanding and technical skills through sustained engagement (Hayes *et al.*, 2021). Documentation and observation techniques are crucial for understanding and supporting artistic development, particularly in educational settings. These methods help educators and students gain insights into the creative process and foster artistic growth. Systematic observation protocols combined with flexible recording strategies help educators track progress and plan appropriate interventions while maintaining the spontaneous nature of artistic exploration.

The integration of digital technology into arts education requires careful consideration of both its advantages and limitations. When thoughtfully implemented, digital tools can enrich traditional artistic experiences while preserving the essential hands-on engagement that defines practical arts education (Hua & Yu, 2024). Collaborative learning strategies such as group projects and shared creative experiences foster social development and collective creativity, reflecting the inherently social nature of artistic knowledge and expression (Ekeh, 2023a). Overall, this study examined the implementation of play-based learning within early childhood arts education, outlining both its benefits and challenges. The findings highlighted the importance of striking a balance between structured guidance and creative autonomy, grounded in theoretical frameworks such as J. Dewey's experiential learning theory. Central themes include the pivotal role of teacher training and professional development, institutional barriers such as limited time and resources, and the considered integration of technology. These insights offer valuable guidance for enhancing play-based practices and addressing systemic obstacles in early years arts education.

CONCLUSIONS

This study offers significant insights into the integration of play-based learning within early childhood creative arts education, highlighting the intricate "dance of pedagogy" that educators must navigate as they balance structured guidance with creative freedom. This research is grounded in theoretical framework of J. Dewey's experiential learning model, which provide essential perspectives for understanding how play facilitates cognitive and artistic

development in young children. However, translating these theories into classroom practice presents a considerable challenge for educators.

Professional development and training are crucial for equipping educators with the skills necessary to implement play-based approaches effectively. Workshops, mentoring, and collaborative learning opportunities bridge the gap between theory and practice, enabling teachers to confidently integrate play-based learning into their creative arts instruction. Despite these efforts, institutional constraints, including rigid schedules and limited resources, pose significant barriers to play-based learning. There is a clear need to reframe curriculum design and resource allocation to better support creative enquiry and artistic expression in early childhood education.

Digital technology presents promising opportunities to enhance creative arts education when it is thoughtfully integrated as a complement to hands-on experiences. However, maintaining a balance with traditional approaches is essential to ensure that children receive a comprehensive artistic education. Educators demonstrate remarkable creativity in overcoming challenges and adapting structured curricula to incorporate more open-ended and exploratory activities that promote student agency and engagement. This adaptability is crucial for the successful implementation of play-based learning in creative arts education.

This study underscored the importance of aligning pedagogical practices with children's developmental needs through flexible, play-centred approaches. It also emphasises the necessity of systemic support, including targeted teacher training and policy adjustments, to overcome practical constraints. Moving forward, continued research on effective implementation strategies and professional development models is needed. Additionally, policymakers and

educational leaders should prioritise creating supportive institutional environments that value play-based learning in creative arts education.

It can be can better nurture children's artistic potential and support their holistic development by fostering pedagogical approaches that balance structure and creative freedom. This study contributes to the growing body of evidence supporting the integration of play-based learning in early childhood creative arts education and provides a foundation for future research and practice in this important area. Further research should explore the long-term effects of play-based creative arts education, effective teacher training, and the integration of digital tools without losing hands-on engagement. Key areas include institutional support, cross-cultural comparisons, inclusive practices for diverse learners, and the role of environment and family involvement in supporting creative development.

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CONFLICT OF INTEREST

The authors declare that no conflicts of interest exist. Neither of us has financial, professional, or personal relationships that could have improperly influenced or biased our work.

REFERENCES

- [1] Ata-Akturk, A., & Sevimli-Celik, S. (2020). Creativity in early childhood teacher education: Beliefs and practices. *International Journal of Early Years Education*, 31(1), 95-114. [doi: 10.1080/09669760.2020.1754174](https://doi.org/10.1080/09669760.2020.1754174).
- [2] Aulakh, D., Rajiv, A., Goyal, P., Garg, A., Khurana, S., Singh, A., & Singh, P. (2024). Assessing the impact of creative tasks on cognitive and imaginative development in children. *Evolutionary Studies in Imaginative Culture*, 8.2(S2), 1011-1022. [doi: 10.70082/esiculture.vi.1099](https://doi.org/10.70082/esiculture.vi.1099).
- [3] Brovchak, L., Starovoit, L., Likhitska, L., Todosiienko, N., & Shvets, I. (2024). Integrating music, drama, and visual arts in extracurricular programs: Enhancing psychological development in early school-aged children. *Sapienza International Journal of Interdisciplinary Studies*, 5(3), article number e24052. [doi: 10.51798/sijis.v5i3.791](https://doi.org/10.51798/sijis.v5i3.791).
- [4] Catalano, H., Albulescu, I., Stan, C., Mestic, G., & Ani-Rus, A. (2023). Child-centred approach through slow education principles: A view of child personality development in early childhood. *Sustainability*, 15(11), article number 8611. [doi: 10.3390/su15118611](https://doi.org/10.3390/su15118611).
- [5] Cheung, R. (2012). Teaching for creativity: Examining the beliefs of early childhood teachers and their influence on teaching practices. *Australasian Journal of Early Childhood*, 37(3), 43-52. [doi: 10.1177/183693911203700307](https://doi.org/10.1177/183693911203700307).
- [6] Creaghe, N., & Kidd, E. (2022). Symbolic play as a zone of proximal development: An analysis of informational exchange. *Social Development*, 31(4), 1138-1156. [doi: 10.1111/sode.12592](https://doi.org/10.1111/sode.12592).
- [7] Dewey, J. (1938). *Experience and education*. New York: Macmillan Company.
- [8] Dewi, M.S., & Yufiarti. (2021). Play-based learning activities for creativity in children's dance movement. *JPUD – Jurnal Pendidikan Usia Dini*, 15(1), 101-120. [doi: 10.21009/jpud.151.06](https://doi.org/10.21009/jpud.151.06).
- [9] Ekeh, M.C. (2023a). Developing early graders' collaborative skills through group work and play-based pedagogy. *International Journal of Learning, Teaching and Educational Research*, 22(4), 160-177. [doi: 10.26803/ijlter.22.4.10](https://doi.org/10.26803/ijlter.22.4.10).

- [10] Ekeh, M.C. (2023b). Play-based pedagogy and creativity for early grade and preschool learners. *Journal for Educators, Teachers and Trainers*, 14(4), 278-289. [doi: 10.47750/jett.2023.14.01.005](https://doi.org/10.47750/jett.2023.14.01.005).
- [11] Garaigordobil, M., Berrueto, L., & Celume, M. (2022). Developing children's creativity and social-emotional competencies through play: Summary of twenty years of findings of the evidence-based intervention "Game Program". *Journal of Intelligence*, 10(4), article number 77. [doi: 10.3390/jintelligence10040077](https://doi.org/10.3390/jintelligence10040077).
- [12] Göthberg, M., Björck, C., & Mäkitalo, Å. (2018). From drama text to stage text: Transitions of text understanding in a student theatre production. *Mind, Culture, and Activity*, 25(3), 247-262. [doi: 10.1080/10749039.2018.1480633](https://doi.org/10.1080/10749039.2018.1480633).
- [13] Halverson, E., & Sawyer, K. (2022). Learning in and through the arts. *Journal of the Learning Sciences*, 31(1), 1-13. [doi: 10.1080/10508406.2022.2029127](https://doi.org/10.1080/10508406.2022.2029127).
- [14] Hayes, N., Maguire, J., & O'Sullivan, C. (2021). Professional development in arts education for early childhood education: A creative exchange model. *International Journal of Early Childhood*, 53, 159-174. [doi: 10.1007/s13158-021-00290-y](https://doi.org/10.1007/s13158-021-00290-y).
- [15] Hooshyari, F., Molanorouzi, K., Ghasemi, A., & Kashi, A. (2023). The effectiveness of a selected movement program with structured, unstructured, and mixed on the social and psychological development of children aged 4 to 6 years. *Shenakht Journal of Psychology and Psychiatry*, 10(4), 15-26. [doi: 10.32598/shenakht.10.4.15](https://doi.org/10.32598/shenakht.10.4.15).
- [16] Hua, C., & Yu, M. (2024). Innovations in art education: Analysing new teaching methods, technology integration, and unique curriculum designs reshaping art education in higher education institutions. In *Abstracts of the 5th world conference on arts, humanities, social sciences, and education* (pp. 81). Vienna: Eurasia Conferences. [doi: 10.62422/978-81-968539-1-4-048](https://doi.org/10.62422/978-81-968539-1-4-048).
- [17] Lee, B., Patall, E., Cawthon, S., & Steingut, R. (2015). The effect of drama-based pedagogy on PreK-16 outcomes. *Review of Educational Research*, 85(1), 3-49. [doi: 10.3102/0034654314540477](https://doi.org/10.3102/0034654314540477).
- [18] Lindsay, G. (2020). Visual arts pedagogy in early childhood contexts: The baggage of self-efficacy beliefs, pedagogical knowledge, and limited pre-service training. *Australasian Journal of Early Childhood*, 46(1), 80-92. [doi: 10.1177/1836939120979061](https://doi.org/10.1177/1836939120979061).
- [19] Luo, G. (2024). The contributions of John Dewey's philosophy of pragmatism to understanding education and its reform. *Journal of Education and Educational Research*, 10(2), 224-228. [doi: 10.54097/8evhak06](https://doi.org/10.54097/8evhak06).
- [20] Miseliūnaitė, B., Kliziene, I., & Cibulskas, G. (2022). Can holistic education solve the world's problems: A systematic literature review. *Sustainability*, 14(15), article number 9737. [doi: 10.3390/su14159737](https://doi.org/10.3390/su14159737).
- [21] Pepler, K., Dahn, M., & Ito, M. (2022). Connected arts learning: Cultivating equity through connected and creative educational experiences. *Review of Research in Education*, 46(1), 264-287. [doi: 10.3102/0091732X221084322](https://doi.org/10.3102/0091732X221084322).
- [22] Prins, J., Van Der Wilt, F., Van Der Veen, C., & Hovinga, D. (2022). Nature play in early childhood education: A systematic review and meta-ethnography of qualitative research. *Frontiers in Psychology*, 13, article number 995164. [doi: 10.3389/fpsyg.2022.995164](https://doi.org/10.3389/fpsyg.2022.995164).
- [23] Rathunde, K., & Isabella, R. (2020). Incorporating the creative arts in an educational presentation about play: A novel strategy for enhancing communication and engagement with parents. *International Journal of Play*, 9(4), 457-468. [doi: 10.1080/21594937.2020.1843807](https://doi.org/10.1080/21594937.2020.1843807).
- [24] Švábová, B., & Dolinská, E. (2024). Play as a means of communication for the child with art. *International Review for Human and Natural Sciences*, 14(1). [doi: 10.59505/irhns.22352007.2024.1.04](https://doi.org/10.59505/irhns.22352007.2024.1.04).
- [25] Vasiuk, O.V., & Vyhovska, S. (2023). Organization of teacher education (comparative analysis). *Humanities Studies: Pedagogy, Psychology, Philosophy*, 11(3), 24-31. [doi: 10.31548/hspedagog14\(3\).2023.24-31](https://doi.org/10.31548/hspedagog14(3).2023.24-31).

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Танець педагогіки: інтеграція гри у творчу мистецьку освіту дітей раннього віку

Анотація. Це дослідження мало на меті з'ясувати, як педагоги концептуалізують, впроваджують та рефлексують ігрові педагогічні практики в контексті навчання творчих мистецтв. Використовуючи якісну феноменологічну методологію, дослідження включало напівструктуровані інтерв'ю з сімома дошкільними педагогами, які проводилися протягом п'яти тижнів. Дані були проаналізовані за допомогою інтерпретаційного феноменологічного аналізу та підкріплені рефлексивним веденням щоденників, щоб відобразити глибину досвіду учасників. Це дослідження вивчало інтеграцію ігрового навчання в дошкільну мистецьку освіту, зосереджуючись на його впливі на когнітивну гнучкість, розв'язання проблем і творче самовираження. Результати продемонстрували, що ігрові стратегії значно сприяють художньому самовираженню та когнітивному розвитку дітей молодшого віку. Освітняники повідомили, що адаптували структуровані навчальні програми, включивши до них відкриті та дослідницькі завдання, які сприяють активності та залученню учнів. Незважаючи на ці переваги, учасники визначили кілька бар'єрів на шляху до ефективного впровадження, серед яких жорсткі навчальні графіки, обмежений доступ до матеріалів і недостатні можливості для професійного розвитку. Це дослідження підкреслило важливість узгодження педагогічних практик з потребами розвитку за допомогою гнучких та ігрових підходів. Дослідження також наголосило на необхідності системної підтримки, зокрема цілеспрямованої підготовки вчителів та коригування політики, для подолання практичних обмежень. Ці висновки роблять внесок у дискусію про дошкільну освіту, пропонуючи практичні рекомендації щодо ефективної інтеграції ігрового навчання в навчальні програми з образотворчого мистецтва. Це дослідження закликає до переоцінки існуючих освітніх систем з метою кращої підтримки інноваційних, орієнтованих на дитину методик викладання, які відповідають сучасному розумінню раннього навчання та розвитку

Ключові слова: мистецька інтеграція; мистецька навчальна програма; когнітивний розвиток; ігрове навчання; міжнародні педагогічні практики; дошкільна освіта; педагогічні інновації

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The use of ChatGPT while Maritime English teaching and assessment

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Abstract. ChatGPT is a powerful tool widely used by many students. It is important for educators to understand how it can be utilised to reduce the time spent on repeated assessments. The aim of this study was to enhance the teaching of Maritime English through the use of ChatGPT. The research employed methods such as analysis, systematisation, observation, comparison, generalisation, and interpretation of results. The article explored the potential of using a new AI-powered chatbot in the teaching of Maritime English and in the assessment of future marine engineers. By leveraging ChatGPT's capabilities, Maritime English instructors were able to offer students an interactive language learning experience that simulates real-life communication scenarios. This innovative approach not only improved students' language skills but also prepared them for effective communication at sea. It was found that ChatGPT can generate coherent and contextually appropriate responses, as it is initially trained on a diverse dataset before being fine-tuned for specific tasks, and processes sequential data – making it particularly effective for understanding natural language. The study outlined the functions of the chatbot and presents a model for implementing ChatGPT in Maritime English teaching. It concluded with challenges encountered during the research and suggested possible solutions. The study highlighted that ChatGPT can provide instant feedback on grammar, vocabulary usage, and communication style, enabling students to continuously improve their language proficiency. It can be used for both oral and written assessments, providing accurate evaluations of students' language competence and communicative abilities. Integrating ChatGPT into existing Maritime English courses can complement traditional teaching methods and increase student engagement. The findings of the study can be used by Maritime English educators to enhance their knowledge of how to effectively integrate ChatGPT into their lessons

Keywords: maritime institutions; marine professionals; digitalisation; LMS MOODLE; e-learning

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INTRODUCTION

Artificial intelligence (AI) in education is gaining immense traction these days, and for good reason. Traditional education often takes a one-size-fits-all approach, neglecting individual learning styles and needs. AI, however, can tailor learning experiences to each student, offering personalised learning paths, materials, and feedback. Educators spend a significant amount of time on administrative tasks and repetitive assessments. AI can automate these processes, freeing up valuable time for teachers to focus on more meaningful interactions with students, like providing guidance, fostering creativity, and building stronger relationships.

Indian researchers recommend that though Chat GPT is still in the formative stages of its development, it can be used as a tool for Teaching and Learning but only responsibly (Sharma & Yadav, 2023). Their opinion was that teachers' English assignments submitted to Chat-GPT produced results that were better than those of many of their pupils. P. Ruchika & P. Ritvik (2022) listed advantages and disadvantages of integrating this chatbot technology into Indian system of education. Their findings can be used to compare with maritime education and training worldwide. R.M. Varghese (2023) analysed how ChatGPT works, the ways AI and Machine learning can transform higher education in India, possible consequences. His works show the importance of a comprehensive transformation in the education system to embrace and integrate AI tools effectively.

The survey among teachers was conducted by N. Iqbal *et al.* (2022) to find out teachers' attitude towards using ChatGPT to revolutionise education. The results of their research suggest that teaching staff needs more information and training on the use of ChatGPT to make informed decisions about this AI chatbot because even while pre-survey stage most of the faculty members had a negative perception and attitude towards using ChatGPT. Z. Xiaoming (2022) suggested to adjust learning goals (e.g. students should be able to use AI tools to conduct subject-domain tasks and education should focus on improving their creativity and critical thinking rather than general skills). His another recommendation is "researchers should design AI-involved learning tasks to engage students in solving real-life problems".

Researcher P. Chew (2024) has created a method with the help of which it is possible to overcome errors in ChatGPT while studying marine engineering. His findings hold the potential to revolutionise the mathematical aptitude of ChatGPT. D. Satterwhite (2024) has shown the impact of ChatGPT as a tool to be used in the Marine Engineering Technology curriculum. He pointed out that the pedagogical strategies should be changed and utilise ChatGPT must perpetually evolve. The group of scientists Z. Zheng *et al.* (2023) has proposed to use ChatGPT as a base of new vision-language model specially designed for the marine domain – MarineGPT. It already involves specific knowledge on marine industry and is able for adapting.

Although, the studies on the use ChatGPT while Maritime English teaching and assessment weren't found, so the

aim of the study was to simplify the teacher's work when using ChatGPT in teaching maritime English.

MATERIALS AND METHODS

The following methods were used in the research: theoretical methods of research (analysis of scientific and methodological literature, systematisation, generalisation of different approaches to the presented problem); empirical methods (observation, comparison, thematic assessment of students' knowledge) and genealogic (generalisation and interpretation of research results). Students of the second year of Maritime Applied College of Kherson State Maritime Academy, Odessa, Ukraine (aged 17-18, male) took part in the experimental research process. The study used a complex of empirical and theoretical methods that provided a comprehensive study of the problem and justification of the results obtained.

The students were divided into two groups: experimental (26 students will be trained using ChatbotGPT while Maritime English for future ship engineers course) and control one (27 students will be trained using the traditional methods of e-learning: LMS MOODLE, Zoom video-conferences). By the end of the study, participants in both groups will be assessed using a standardised Maritime English test on LMS MOODLE. The study involved conducting a diagnostic assessment on the previous topic by testing, which allowed determining the Level of students' knowledge and identifying key difficulties in mastering the educational material. Analysis of the results showed that a significant part of the students have an insufficient Level of basic professional vocabulary, shortcomings in the grammatical design of speech, limited vocabulary, and also face difficulties in understanding the content of professional texts.

During the pedagogical experiment, one of the key methods of collecting empirical data was the observation of students' learning activities during English classes for professional purposes. This made it possible to determine the Level of interest in completing educational tasks, as well as to assess the degree of their initiative and independence. The results of the observation showed that at the initial stage of learning, the activity of students remained low: most of them showed passivity in group work, and avoided the use of English in everyday communication. However, in the middle of the experiment, students began to show interest due to personalised learning that met their individual needs, the availability of materials that allowed students to study at any time, as well as the opportunity to communicate for conversational practice.

All processes carried out in the study comply with ethical standards and do not violate the respondents' honor and dignity; the students' psychological characteristics, including age, were taken into account. During the experiment, no one's rights were violated, and anonymity was maintained by the recommendations on the ethical aspect of conducting pedagogical research, developed by authoritative organisations, in particular the American Educational

Research Association (2011) and the British Educational Research Association (2018).

RESULTS AND DISCUSSION

To systemise the data found and analysed in recent research on ChatGPT in education the following unified term on AI chatbots were proposed. They have been seen as applications which use AI technologies to simulate human-like conversation and interaction. One of the most popular AI chatbots is ChatGPT where GPT stands for Generative Pre-trained Transformer. It means this chatbot is able to generate coherent and contextually relevant responses, it is initially trained on a diverse dataset before fine-tuning for specific tasks and it processes sequential data, making it particularly effective for natural language understanding.

To study the problem on how to use this technology during Maritime English education the purpose of Maritime English courses was first of all determined. Maritime

English is found as one of the essential tools for ship engineers, navigators, electrical engineers, and others working in the maritime transport industry. It includes a wide range of terminology and phraseology for communication between seafarers from different countries while on watch, as well as for communication with port services and other authorities. Learning Maritime English can be a daunting task. This is because Maritime English has its own vocabulary, which differs from spoken English with many technical terms.

The goal of Maritime English education is in the formation of communicative competence of future seafarers in order to communicate effectively while working in the maritime industry (e.g. onboard the vessel, in the engine room). To find the ways of ChatGPT use while teaching and assessment ChatGPT was proposed to create a list of them. A free version of ChatGPT which is open to anyone for research purposes was used. Figure 1 represents the answer generated by ChatGPT.

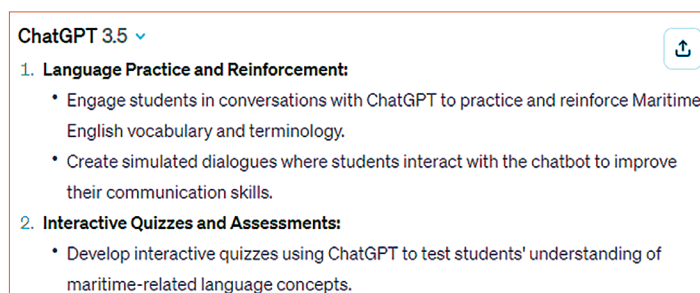


Figure 1. ChatGPT's list of possible ways of its use while Maritime English teaching

Source: prepared on the basis of ChatGPT

AI chatbots can be used to teach Maritime English for several reasons. First, they can provide personalised training that meets the individual needs of the user. Second, they can be available 24/7, allowing users to learn at any time. Third, they can be used to practice speaking with native speakers, even if native speakers are not available. Thus, the Assignment with the instruction to simulate a conversation with ChatGPT was created on LMS MOODLE Maritime English course for future ship

engineers of Kherson State Maritime Academy. External link to free and open version of ChatGPT was also added for students' convenience. Assignment on LMS MOODLE is type of activity which allows teacher to collect the works of students in any format (e.g. documents, figures). Figure 2 represents LMS MOODLE page from Maritime English course (Module 3: Ship's Systems) where instructions of teacher can be seen (Assignment activity).

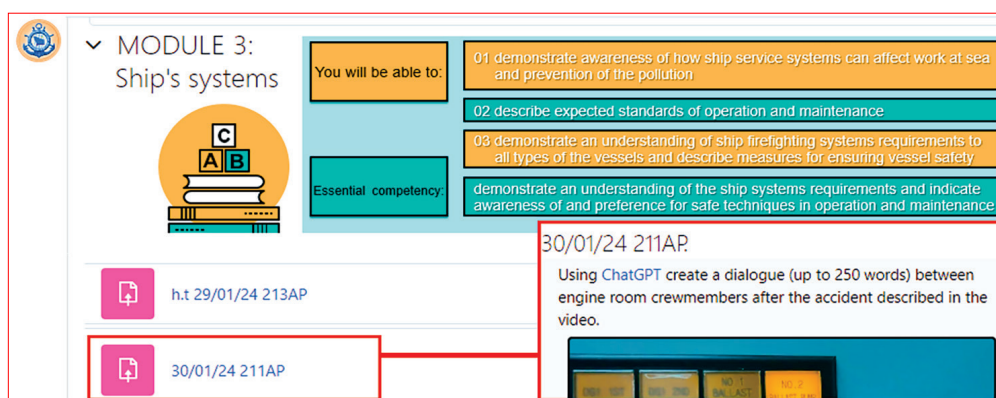


Figure 2. Assignment created by teacher for future ship engineers of KSMA

Source: Maritime English course on LMS MOODLE of KSMA

Students usually have a fairly easy time with simple reading texts, but when it comes to dialog, they often find it difficult to find the words, let alone talk to a foreigner (Sakib *et al.*, 2021). Performing roles in specially created imaginary conditions to reproduce (or simulate) the activities of the ship's engineers and the relationships between them on the watch or during training is important during the lesson. In such a game, all mental qualities and features of the student's personality are formed most intensively. Game activity affects the formation of arbitrariness of behaviour and all mental processes - from elementary to the most complex. In the game conditions, students concentrate better and remember more, than in a task, for example, to read a text (Sherman *et al.*, 2020).

The game affects the mental development of the student. Acting with substitute objects, he begins to operate in an imaginary, conventional space, and gradually the game contributes to the fact that the student moves to thinking in terms of images and ideas and develops creative and critical thinking. In addition, playing different roles in the game, the student takes different points of view and begins to see

the subject from different angles (Semerikov *et al.*, 2020). Communication, which is so important in an international crew, unfolds mainly in the process of a compatible game, during which they begin to consider each other's ideas and actions, defend their point of view, and build and implement compatible plans (Schaffzin, 2016).

There are also possible ways to simulate real-life conversations which could happen between student and some else. In this variant student doesn't role play (pretend he is someone else) but simulate real situation which could happen with him (e.g. interview to crewing company). One of the examples of such activities is described further. To practice communication skills, the task of Maritime English teacher is to use list of interview questions from LMS MOODLE (Page activity) and to create a conversation using ChatGPT. The interview questions can be chosen from real crewing company (e.g. V. Ships (n.d.) provides list of questions mutual and different for navigators, ship engineers and electrical engineers on their official website). Figure 3 shows MOODLE and ChatGPT pages with teacher's task and ship engineering cadet's question to ChatGPT.

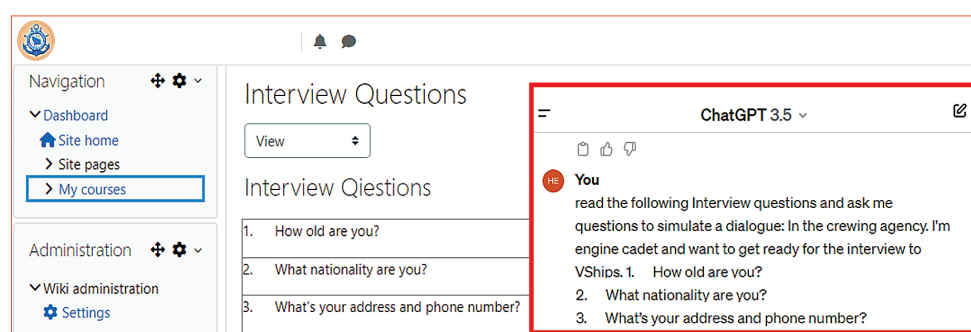


Figure 3. Assignment created by teacher and ChatGPT's question of cadet to simulate a dialogue

Source: ESP course on LMS MOODLE of KSMA

Creating tests takes up a huge amount of teacher's time. Every module should contain at least one or two tests due to which students can see the problems they have in vocabulary or grammar and what to repeat or study. Maritime English course for second year cadets includes seven tests: five tests are done by the end of every module and called Stop and Checks, in the middle of studying (after third Stop and Check) and by the end of the year students also do Progress Tests (Volkova, 2021). ChatGPT can be used to perform different types of tests and save time for teachers to write them. Tasks such as multiple choice, true/false, essays and matching can be performed by ChatGPT, but inaccuracies in the use of vocabulary can be one of the drawbacks (Thorp, 2023). Also, test surveys are very popular in crewing agencies (e.g. Marlins test). After all, they allow future seafarers to check the Level of their assimilation of the material quickly and effectively and automatically construct statistical data on success based on the results of the work performed (Van Dis *et al.*, 2023). Figure 4 represents MOODLE's Question bank which includes Categories. There are three big groups of questions: Level 1, Level 2 and Level 3.

According to each level, the teacher must prepare a separate number of questions. For example, for Level 1 there should be 18 special tasks ("match" words and definitions, label pictures, "multiple choice", drag and drop into text/onto images/markers, choose the correct option (where only single or multiple responses are correct), listen to the dialogue and mark the correct picture, etc.) two points for each correct answer (36 points in total). For Level 2 there should be 10 tasks (match half statements, grammar exercises, true/false statements, multiple choice (choose the correct heading for a paragraph/advertisement), put the words in the correct order to make a statement, choose the correct word, fill in the gaps, put dialogue cues in the correct order, complete the chart, etc.) five points for each correct answer (50 points in total). Level 3 contains two tasks (write an essay, read the text and mark the true/false statements after the text, write down the words (with vocabulary from the module, the correct grammatical tense) every 7 points (14 in total). So, for each test, the teacher must prepare 30 tasks using special vocabulary for each module (Striuk & Semerikov, 2022). To facilitate the work,

the teacher can use ChatGPT and the AI can do it in a few seconds. The task for the teacher is only to edit and review

all created questions to ensure accuracy and relevance to learning objectives (Haleem *et al.*, 2022; Dubovyk, 2024).

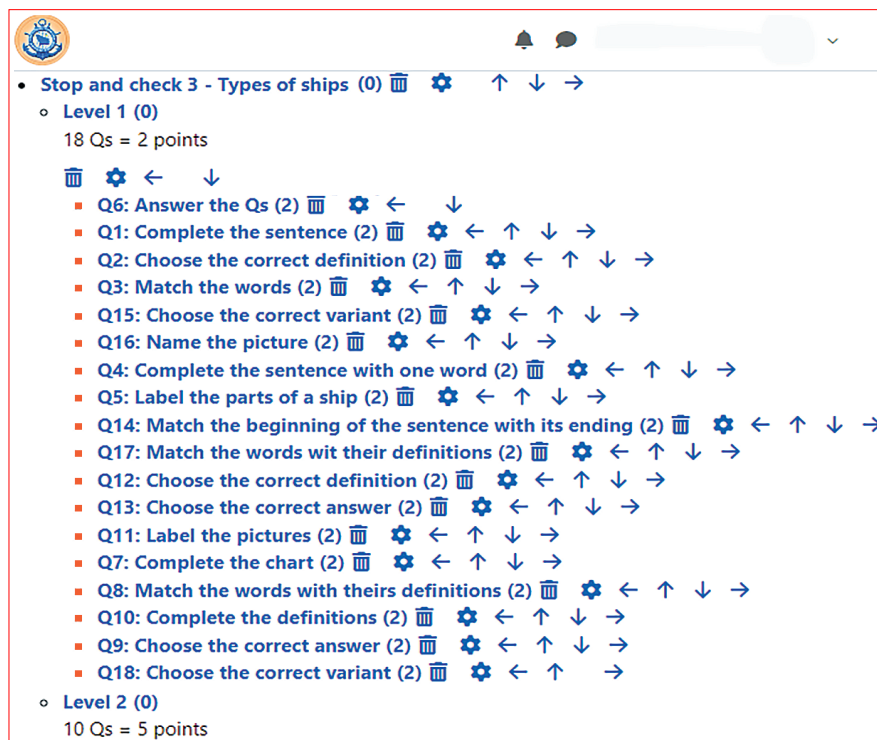


Figure 4. Question bank which includes categories of Stop and check 3 questions with description

Source: ESP course on LMS MOODLE of KSMA

As can be seen Level 1 is the biggest one and the simplest and the third Level has only two tasks, but they are the heaviest, and students try to do them the last and sometimes have not enough time to complete all tasks. Also, using tools like ChatGPT to help create tests for teachers can be a double-edged sword (Biswas, 2023). While it offers potential benefits like saving time (ChatGPT can quickly generate a variety of question formats, from multiple choice and matching to open-ended and essay-based, helping assess different learning styles and objectives, freeing up teachers' time for more complex tasks like designing assessments, providing feedback, and individualising instructional, there are several potential drawbacks and ethical considerations to keep in mind:

- ChatGPT can contain inaccuracies (Zhai, 2022);
- it primarily generates factual questions, which may not effectively assess higher-order thinking skills like analysis, evaluation, and synthesis (Valko *et al.*, 2021);
- and of course "academic integrity" because students could be misused for plagiarism or cheating on tests (Patel & Lam, 2023).

Training of future ship engineers to modern professional activity should be not only practically oriented but also filled with the content of innovative technologies. Among the most effective methods of preparing future ship engineers for professional training activities is the case method. The case method is the use of specific cases (situations,

stories, the texts of which are called "case") for joint research and analysis, discussion, or development of solutions for a specific situation or as an innovative method that promotes the development of critical thinking, teaches systematically in a close circle the relationship between theory and practice to solve current problems of education and future professional activity (Stokel-Walker, 2022). Teachers specially prepare educational material for the class, which contains a structured description of the situation, which is borrowed from real practice. A case immerses the student in a problem and forces him to find a solution to a specific task (Dyagileva *et al.*, 2021).

An artificially created professional environment makes it possible to combine independent cognitive activity of students, theoretical training and practical skills necessary for creative activity in the professional sphere. In the process of solving a problem situation, students update the set of previously acquired knowledge necessary for this. Moreover, situational tasks are selected taking into account the specifics of the specialty (maintenance and repair of auxiliary mechanisms on ships, fire training, bunkering, etc.). In addition, Chat GPT can help create cases of problematic professional situations to solve during lessons (Shen *et al.*, 2023).

Despite all the advantages of using chat, it cannot replace authentic texts, but you can also set tasks for cadets. The example of teacher's task is "Compare the case created by ChatGPT with the described authentic marine accident".

Students observed that the case written by ChatGPT has superficial content, inaccurate data and sometimes unclear course of events, while the authentic text taken from the marine journal provides an understanding of the event and how to prevent it next time. Seafarers need to develop writing skills, because they need to fill out a lot of documents on the ship (as in the engine room and on the navigation bridge also), and ChatGPT can help in creating such documents as log entries, incident reports, oil record books, training record books, and other relevant maritime documents. And the teacher can use such created documents at the lessons (Yakhontova, 2003). All generated documents (texts, dialogues, cases) by ChatGPT can be used by teacher when they will be loaded on a slide and displayed on the screen during e-learning (e.g. Zoom videoconference). Before the teacher decided to use ChatGPT, a survey on MOODLE was conducted. The question was following: "How do you think will ChatGPT help you in learning Maritime English?". According to statistics the results are shown in Figure 5.

Before the experiment: "Will ChatGPT help you in learning Maritime English?"	
Yes	No
43.7%	56.3%

Figure 5. Survey results

Source: prepared on the basis of research data collected on LMS MOODLE of KSMA

Also, the students were advised to use ChatGPT as a starting point, not as a finished product and emphasise ethical academic integrity. Encourage them to develop critical thinking skills that cannot be easily replicated by AI. In the study, a reasonable choice of research methods and the survey results of students who worked with the Chat GPT were made, and a thematic assessment of student's knowledge before and after using the chat was made. To assess student's knowledge on Maritime English two test, namely English Proficiency Test and Progress Test II were created on LMS MOODLE.

By the end of the experiment, Progress Test II was conducted to assess the Level of Maritime English knowledge of future seafarers. Figure 6 shows Test results of the students from experimental group by the end of a course and control group. There are no marks in a range of 2.5 up to 3.7 in experimental group at all, while the control group has these grades, which is 77.7% of the group, and only 7.4% (including only 2 students) wrote test with positive grades, the quality of knowledge in the group is only 14.8%. The experimental group has a better percentage of knowledge acquisition and higher grades, 3.37-4.00 – is 3.8% (1 student), 4.00-4.25 – 7.6% (2 students), 4.25-4.50 – 6.6% (4 students), 4.50-4.75 – 26% (7 students), 4.75-5.00 – 46% (12 students), the quality of knowledge in the group is 96%. Maritime English using a chatbot performed significantly better than those who learned Maritime English using traditional methods of e-learning.

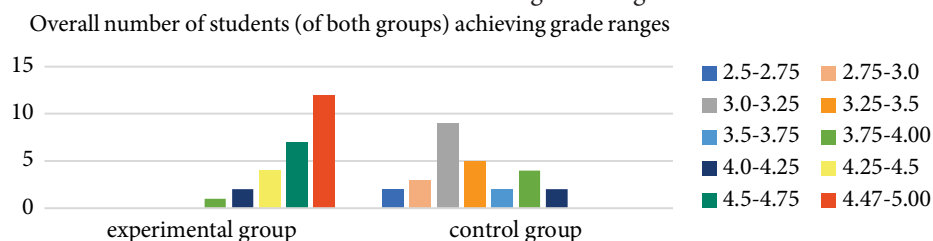


Figure 6. Maritime English course: Progress test 2 results

Source: prepared on the basis of research data collected on LMS MOODLE of KSMA

After the experiment, experimental group students to rate the following questions:

- Did the chat help you in your studies?
- What is the biggest advantage of using it?
- What did you like/dislike? (Tyron et al., 2020).

Figure 7 shows the percentage of students' answers, where:

- 88.3% admitted that ChatGPT helped them in studying Maritime English;
- 56.7% pointed out that it advised them in solving problems and helped students with ideas what to write in an essays (Gucma et al., 2023);
- 73% of respondents stressed that it was convenient for them to have quick answers;
- 22% conceded that chat could give not accurate information (Semerikov et al., 2023).

To receive the feedback from experimental group's students after experiment second Survey was created by the end of Maritime English course on LMS MOODLE (Liashenko, 2024). Using ChatGPT students said that it can have both positive and negative effects, for example:

- ChatGPT can provide a personalised and responsive experience while studying Maritime English;
- it can access a lot of information and provide relevant answers, helping students learn and discover new things;
- making posters, projects, and home tasks with ChatGPT can save time and resources by reducing human effort and costs.

Students also confessed that they had problems with using ChatGPT by their own, namely the following:

- inaccurate or biased responses – ChatGPT can make mistakes;

● ChatGPT may not fully understand the context or intent of users' requests, leading to misunderstandings;

● using ChatGPT involves processing user data, and raising concerns about privacy, data storage and security.

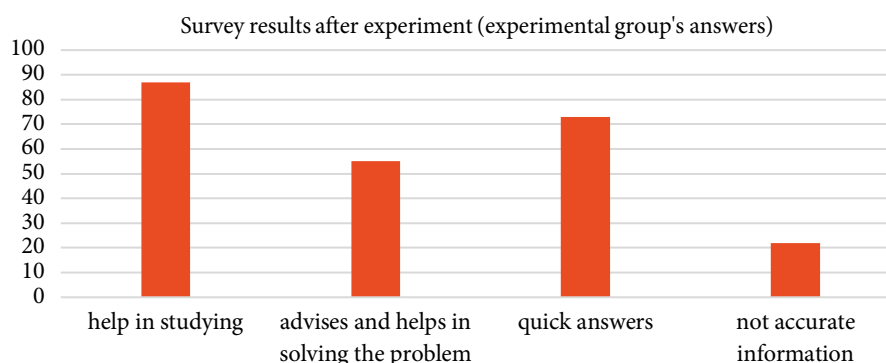


Figure 7. Survey results after experiment

Source: prepared on the basis of research data collected on LMS MOODLE of KSMA

The results of the research show ChatGPT's impact on students' performance while Maritime English studying (e.g., students' engaging in learning process and efficiency. It allows students to simulate dialogues on professional topics and explore real-life scenarios more effectively. The results of the last test (Progress Test II) showed that the experimental group using ChatGPT far outperformed the control group, achieving a 96% knowledge quality rate versus 14.8%. It is a notable improvement in students' communicative competence. Comparing the results of the experiment with others, it can be concluded that while medical writing, the use of ChatGPT has the potential to revolutionise this field, but it is not yet able to fully replace human medical writers (Biswas, 2023). Though it can fully support the routine needs of the social structure (Haleem *et al.*, 2022). Other results of different experiments show mostly the same conclusions: potential opportunities to use this technology, but the need for a real person to review the output of a generative AI model before it is used (Patel & Lam, 2023; Ruchika & Ritvik, 2022; Shen *et al.*, 2023).

Also, it is of high importance the ChatGPT is not always available, if students must speak verbally (take an exam or interview), then it will not be able to help them in any way, and only the knowledge that the students acquired while studying the topics of the course (for a student, it can be from 12 to 16 subjects per semester) can help them in passing not only written but also oral exams. Maritime English requires precise terminology and understanding of technical concepts but ChatGPT responses may not always be accurate or reliable.

The specifics of a future seafarer's work require both general and specialist competencies in maritime activities. These include the following abilities:

- to keep a safe watch in the engine room;
- to ensure fire safety and the ability to fight fires on ships;
- to operate the main and auxiliary mechanisms and related control systems;
- to operate fuel, lubrication, ballast and other pumping systems and related control systems;

- to perform the necessary actions, calculations and records during operations with petroleum products;

- to use in-ship communication systems, etc.

Ship engineer must possess these competencies not only as knowledge, but also in practice, because knowing and being able to complete the task is a big difference, and therefore ChatGPT can teach, but the student should not constantly turn to him for help every time. He should be responsible in his duties and work in team and individually. ChatGPT may not fully reproduce the depth of human interaction, but it still provides valuable help and information in a text format. It has impressive capabilities, but the student is more likely to interact with people on the ship than with a computer, so communication skills are vital to safety and efficiency. Teachers can identify and respond to students' emotional states, encouraging, de-escalating anxieties and creating a supportive learning environment. ChatGPT does not have this capability, which can leave students feeling confused or unsupported.

Nonverbal communication such as cues, facial expressions, gestures, and tone of voice are critical to understanding meaning and establishing relationships. ChatGPT currently has no way to efficiently interpret or generate these subtleties. Teachers can adjust their lessons, explanations, and interactions to meet individual student needs and unexpected situations. ChatGPT's responses, while flexible, are still limited by its programming and data, making it less adaptable to unique situations. Teachers can guide students through complex maritime scenarios, encouraging critical thinking and problem-solving skills. ChatGPT can provide information and practice, but it cannot replicate the interactive process of collaborative problem solving. Teachers can personalise their approach by adding humour, real-world examples, and storytelling to keep students engaged and motivated. ChatGPT interactions, while informative, tend to be more formulaic and may not hold students' attention for long periods of time. However, while ChatGPT is not a substitute for human interaction, it can be a valuable additional tool for teaching Maritime English.

CONCLUSIONS

The study demonstrates that integrating ChatGPT into Maritime English education significantly enhances both teaching effectiveness and student engagement. By providing instant, personalised feedback and simulating real-life communication scenarios, ChatGPT helps future marine engineers to develop their communicative competence. This approach complements traditional methods, offering an interactive solution for modern maritime training environments.

The results of the study indicate that AI chatbots can be an effective method of teaching Maritime English. They can provide personalised training that meets the individual needs of the user. They can also be available 24/7, allowing users to learn at any time. In addition, they can be used to practice speaking with native speakers, even if native speakers are not available. Based on the results of the study, it can be concluded that AI chatbots have the potential to replace traditional methods of teaching Maritime English. They can make learning Maritime English more effective and accessible to seafarers. Chatbots can be used to deliver

a personalised curriculum tailored to each student's needs. Chatbots can also be used to practice spoken English. It can be difficult for ChatGPT to understand the full context of a question. This can lead to inaccurate answers or incomplete understanding of the user's request. Sometimes they may provide incorrect or insufficiently verified information. A stable Internet connection is required to use ChatGPT or any other.

Prospects for further research can be seen in the analysis of the use of ChatGPT in Collaborative Online International Learning, namely Maritime English for future ship engineers and electrical engineers.

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CONFLICT OF INTEREST

None.

REFERENCES

- [1] American Educational Research Association. (2011). Code of ethics. *Educational Researcher*, 40(3), 145-156. doi: 10.3102/0013189X11410403.
- [2] Biswas, S. (2023). ChatGPT and the future of medical writing. *Radiology*, 307(2), article number e223312. doi: 10.1148/radiol.223312.
- [3] British Educational Research Association. (2018). *Ethical guidelines for educational research*. Retrieved from <https://www.bera.ac.uk/publication/ethical-guidelines-for-educational-research-2018>.
- [4] Chew, P. (2024). *Pioneering tomorrow's AI system through marine engineering. An empirical study of the peter chew rule for overcoming error in Chat GPT*. doi: 10.2139/ssrn.4690360.
- [5] Diahyleva, O., Gritsuk, I., Kononova, O., & Yurzenko, A. (2021). Computerized adaptive testing in educational electronic environment of maritime higher education institutions. *CTE Workshop Proceedings*, 8, 411-422. doi: 10.55056/cte.297.
- [6] Dubovyk, O. (2024). Innovations in ESP teaching and learning practices. *Humanities Studios: Pedagogy, Psychology, Philosophy*, 12(4), 23-33. doi: 10.31548/hspedagog/4.2024.23.
- [7] Gucma, M., Deja, A., & Szymonowicz, J. (2023). Environmental solutions for maritime ships: Challenges and needs. *Production Engineering Archives*, 29(2), 216-224. doi: 10.30657/pea.2023.29.25.
- [8] Haleem, A., Javaid, M., & Singh, R.P. (2022). An era of ChatGPT as a significant futuristic support tool: A study on features, abilities, and challenges. *BenchCouncil Transactions on Benchmarks, Standards and Evaluations*, 2(4), article number 100089. doi: 10.1016/j.tbench.2023.100089.
- [9] Iqbal, N., Ahmed, H., & Azhar, K.A. (2022). Exploring teachers' attitudes towards using ChatGPT. *Global Journal of Management and Administrative Sciences*, 3, 97-111. doi: 10.46568/gjmas.v3i4.163.
- [10] Liashenko, U. (2024). Training of future ship engineers and electricians by means of competence, communicative and interdisciplinary approaches. *ScienceRise: Pedagogical Education*, 3(60), 4-9. doi: 10.15587/2519-4984.2024.305117.
- [11] Patel, S.B., & Lam, K. (2023). ChatGPT: The future of discharge summaries? *The Lancet Digital Health*, 5(3), 107-108. doi: 10.1016/s2589-7500(23)00021-3.
- [12] Ruchika, P., & Ritvik, P. (2022). ChatGPT vs education. *GYANODAYA – The Journal of Progressive Education*, 15(1-2), 13-20. doi: 10.5958/2229-4422.2022.00002.0.
- [13] Sakib, N., Gissi, E., & Backer, H. (2021). Addressing the pollution control potential of marine spatial planning for shipping activity. *Marine Policy*, 132, article number 104648. doi: 10.1016/j.marpol.2021.104648.
- [14] Satterwhite, D. (2024). Impact of Chat GPT on the marine engineering technology curriculum. In *Proceedings of the 2024 conference for industry and education collaboration*. Garden Grove: American Society for Engineering Education. doi: 10.18260/1-2-1145-49058.
- [15] Schaffzin, K.T. (2016). Learning outcomes in a flipped classroom: A comparison of civil procedure II test scores between students in a traditional class and a flipped class. *University of Memphis Law Review*, 46(3), 661-693. doi: 10.2139/ssrn.3956257.

- [16] Semerikov, S., Striuk, A., Striuk, L., Striuk, M., & Shalatska, H. (2020). Sustainability in software engineering education: A case of general professional competencies. *E3S Web of Conferences*, 166, article number 10036. [doi: 10.1051/e3sconf/202016610036](https://doi.org/10.1051/e3sconf/202016610036).
- [17] Semerikov, S.O., Amelina, S., & Tarasenko, P.O. (2023). Enhancing foreign language learning with cloud-based mind mapping techniques. In *Proceedings of the VIII International workshop on professional retraining and life-long learning using ICT: Person-oriented approach (3L-Person 2023)*. (pp. 48-60). Kryvyi Rih: Virtual Event. [doi: 10.31812/123456789/8484](https://doi.org/10.31812/123456789/8484).
- [18] Sharma, S., & Yadav, R. (2023). [Chat GPT – a technological remedy or challenge for the education system](#). *Global Journal of Enterprise Information System*, 14(4), 46-51.
- [19] Shen, Y., Heacock, L., Elias, J., Hentel, K., Reig, B., Shih, G., & Moy, L. (2023). ChatGPT and other large language models are double-edged swords. *Radiology*, 307(2), article number e230163. [doi: 10.1148/radiol.230163](https://doi.org/10.1148/radiol.230163).
- [20] Sherman, M., Samchynska, Y., Sikelinda, M., & Yurzhenko, A. (2020). Formation of digital and research competences in the training of it professionals in a modern university. *Information Technologies in Education*, 44, 18-30. [doi: 10.14308/ite000722](https://doi.org/10.14308/ite000722).
- [21] Ships, V. (n.d.). Retrieved from <https://vships.com.ua/>.
- [22] Stokel-Walker, C. (2022). AI bot ChatGPT writes smart essays – should professors worry?. *Nature*. [doi: 10.1038/d41586-022-04397-7](https://doi.org/10.1038/d41586-022-04397-7).
- [23] Striuk, A.M., & Semerikov, S.O. (2022). Professional competencies of future software engineers in the software design: Teaching techniques. *Journal of Physics: Conference Series*, 2288, article number 012012. [doi: 10.1088/1742-6596/2288/1/012012](https://doi.org/10.1088/1742-6596/2288/1/012012).
- [24] Thorp, H.H. (2023). ChatGPT is fun, but not an author. *Science*, 379(6630), 303-313. [doi: 10.1126/science.adg7879](https://doi.org/10.1126/science.adg7879).
- [25] Tyron, O., Korieshkova, S., Didenko, M., & Kaminska, S. (2020). Psycho-pedagogical approaches to the design of English learning course for ship engineers. *International Journal of Engineering Pedagogy (iJEP)*, 10(6), 21-35. [doi: 10.3991/ijep.v10i6.14107](https://doi.org/10.3991/ijep.v10i6.14107).
- [26] Valko, N.V., Osadchyi, V.V., & Kruhlyk, V.S. (2021). Cloud resources use for students' project activities. *CTE Workshop Proceedings*, 8, 304-317. [doi: 10.55056/cte.240](https://doi.org/10.55056/cte.240).
- [27] Van Dis, E.A., Bollen, J., Zuidema, W., Van Rooij, R., & Bockting, C. (2023). ChatGPT: Five priorities for research. *Nature*, 614(7947), 224-226. [doi: 10.1038/d41586-023-00288-7](https://doi.org/10.1038/d41586-023-00288-7).
- [28] Varghese, R.M. (2023). Is ChatGPT a game changer for higher education in India?. *University News: A Weekly Journal of Higher Education, Association of Indian Universities*, 16(9), 16-20.
- [29] Volkova, A. (2021). Making sense of simulators in teaching maritime English. *Actual Questions of Humanitarian Studies. Pedagogy*, 42, 34-39. [doi: 10.24919/2308-4863/42-3-6](https://doi.org/10.24919/2308-4863/42-3-6).
- [30] Xiaoming, Z. (2022). *ChatGPT user experience: Implications for education*. [doi: 10.2139/ssrn.4312418](https://doi.org/10.2139/ssrn.4312418).
- [31] Yakhontova, T.V. (2003). [English academic writing for students and researchers](#). Lviv: Ivan Franko National University of Lviv.
- [32] Zhai, X. (2022). ChatGPT user experience: Implications for education. *SSRN Electronic Journal*. [doi: 10.2139/ssrn.4312418](https://doi.org/10.2139/ssrn.4312418).
- [33] Zheng, Z., Zhang, J., Vu, T.A., Diao, S., Tim, Y.H.W., & Yeung, S.K. (2023). Marinegpt: Unlocking secrets of ocean to the public. *arXiv*. [doi: 10.48550/arXiv.2310.13596](https://doi.org/10.48550/arXiv.2310.13596).

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Використання ChatGPT під час викладання та оцінювання Морської англійської мови

Анотація. Як потужний інструмент ChatGPT використовується багатьма здобувачами освіти. Важливо знати, як його можна використовувати педагогам, щоб витратити менше часу на повторне оцінювання. Метою дослідження було покращення викладання морської англійської мови за допомогою ChatGPT. У дослідженні використовувалися такі методи як аналіз, систематизація, спостереження, порівняння, узагальнення та інтерпретація результатів. У статті досліджувались можливості використання нового чат-бота зі штучним інтелектом у викладанні морської англійської мови та оцінюванні майбутніх суднових механіків. Використовуючи можливості ChatGPT, викладачі морської англійської мови змогли надати студентам інтерактивний досвід вивчення мови, який імітує реальні сценарії спілкування. Цей інноваційний підхід не тільки покращив мовні навички студентів, але й сприяв підготовці їх до ефективного спілкування на морі. Визначено, що ChatGPT здатний генерувати узгоджені та контекстуально відповідні підходящі, він спочатку навчається на різноманітному наборі даних перед тонким налаштуванням для конкретних завдань і обробляє послідовні дані, що робить його особливо ефективним для розуміння природної мови. Перераховано функції чату та описано модель використання ChatGPT у навчанні морської англійської мови. Дослідження завершується проблемами, які виникли, і пропонуються можливі шляхи їх вирішення. Підкреслено, що ChatGPT може надати миттєвий зворотний зв'язок щодо граматики, використання словника та стилю спілкування, що дозволяє студентам постійно вдосконалювати свої мовні навички. Його можна використовувати для усного та письмового оцінювання, забезпечуючи точні оцінки рівня володіння мовою та комунікативних здібностей студентів. Включення ChatGPT в існуючі курси морської англійської може доповнити традиційні методи навчання та підвищити залучення студентів. Результати дослідження можуть бути використані викладачами морської англійської мови для вдосконалення своїх знань щодо використання ChatGPT під час занять

Ключові слова: морські заклади освіти; морські фахівці; діджиталізація; LMS MOODLE; електронне навчання

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Critical thinking as a means of improving the effectiveness of English language teaching

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Abstract. The purpose of this study was to examine strategies for developing critical thinking skills among students, particularly in the context of learning English, and to determine their impact on improving academic outcomes. The research employed comparative methods, pragmatic analysis, and generalisation techniques, alongside strategies such as project-based learning, problem-based learning, discussions and debates, independent research and reflection, as well as the use of digital technologies to foster critical thinking. The study revealed that cultivating critical thinking in students learning English is crucial for enhancing the effectiveness of their learning process. Among the strategies, project-based learning (4.2 points) and independent research with reflection (4.1 points) yielded the highest student performance, indicating varying effectiveness of these approaches in developing critical thinking. It was established that employing project- and problem-based learning facilitates the development of skills in analysis, argumentation, and real-world problem solving, which are directly linked to critical thinking. Students actively engaged in discussions, improving their ability to justify their viewpoints and consider alternative perspectives. Additionally, the use of digital tools such as Quizlet and Padlet contributed to the development of analytical skills through interactive exercises and collaborative work. Consequently, the findings confirmed that integrating these strategies into the educational process positively influences students' capacity to critically comprehend and apply acquired knowledge. The research enabled educators to implement effective strategies for fostering critical thinking among students, particularly through project- and problem-oriented learning. Educational institutions can utilise the results to enhance curricula and improve the quality of specialist training

Keywords: learners; educational process; specialist training; effective strategies; technology integration

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INTRODUCTION

The relevance of researching critical thinking as a means to improve the effectiveness of English language learning stems from the necessity to develop students' ability to analyse, evaluate, and interpret information, which enhances comprehension and communication skills. Studying English plays a significant role in fostering critical thinking, as the subject requires analysis of lexical nuances, grammatical structures, and contextual understanding. The integration

of critical thinking development technologies in English lessons creates favourable conditions for students' self-realisation and creative activity, which is a key objective of education. The problem addressed in this research lies in the need to develop critical thinking as a core component for increasing the efficiency of English language acquisition. It is essential to understand how critical thinking affects the language learning process as well as students' ability to



analyse, synthesise, and evaluate information. However, challenges exist in implementing methodologies that promote critical thinking development, especially within traditional teaching frameworks.

The authors investigated the implementation of a blended English for Specific Purposes (ESP) course aimed at developing critical thinking skills in computer science students. For instance, N.V. Zaitseva *et al.* (2022) explored a semester-long ESP course combining traditional and online learning, utilising authentic English video materials and multiple-choice testing to assess students' critical thinking levels. C.M. Johnson & A.M. Howard (2025) examined critical thinking development among English learners, emphasising logical reasoning, argumentation, and reasoning skills formation. They analysed how instructional strategies such as argument analysis, debates, critical reading, and essay writing with justified positions enhance students' ability to evaluate and construct arguments.

Additionally, M. Kaviani & D.M. Heidar (2020) studied the impact of critical thinking on developing productive skills among Iranian pre-intermediate students, demonstrating that critical analysis and reflection improve both written and oral performance. Furthermore, S.I. Khan *et al.* (2025) conducted a qualitative study to identify changes in pre-service teachers' perceptions of critical thinking before and after a functional English course, finding that students better understood the importance of critical thinking in the learning process post-training. The attitudes of students towards critical thinking in second language acquisition, particularly English, were also investigated by M. Lailiyah & P.L. Wediyantoro (2021), whose results indicated that positive beliefs and cognitive flexibility contribute to successful language acquisition and better skills in text analysis, argumentation, and problem-solving during second language learning. L. Lazorenko & O. Krasnenko (2020) studied the use of the Agile approach in teaching ESP English. Agile, a flexible project management methodology focusing on rapid iterations, close client interaction, and adaptability to change, was found to enhance student motivation and improve adaptability to evolving learning environments. However, limitations were noted regarding scalability for large projects and insufficient documentation, which can lead to misunderstandings and instability in later stages.

I. Turchyn *et al.* (2022) investigated the development of critical thinking within the Ukrainian educational system, grounding their analysis in Paulo Freire's educational philosophy. They examined how Freire's approach fosters active, independent thinking among students and enhances their engagement in the learning process. Similarly, Z.B. Moghadam *et al.* (2023) studied the impact of a critical thinking development program on English language learners, assessing its effects on students' critical thinking skills, reading comprehension, and group dynamics. Their results indicated that participants exhibited improved analytical and argumentative abilities as well as more active interaction during lessons. A.G. Negoescu (2023) explored

the role of critical thinking in language learning, focusing on its contribution to the formation of analytical skills among students. The study demonstrated that integrating critical thinking into language classes enhances students' understanding of linguistic structures, facilitates higher levels of discourse, and promotes independent thought. X. Yin *et al.* (2023) discussed the importance of critical thinking and the challenges inherent in teaching it. They noted that, despite widespread acknowledgment of critical thinking's significance, there is no consensus on its definition or effective pedagogical methods. Moreover, they emphasised the subject-specific nature of critical thinking, requiring tailored strategies of analysis and synthesis for different knowledge domains.

Despite these contributions, insufficient attention has been paid to the influence of critical thinking on intercultural communication and its application in digital environments. Additionally, the impact of diverse cognitive styles on the efficacy of critical thinking development in language learning remains underexplored. The aim of this study was to identify conceptual approaches and methodological foundations conducive to fostering critical thinking during English language learning. To achieve this aim, the study objectives included: characterising the main theoretical approaches, features, and requirements for developing critical thinking in students studying English; evaluating strategies for critical thinking development and determining the most effective approaches for integration into English language teaching; outlining key recommendations for implementing conceptual approaches in the educational process to enhance students' critical thinking skills.

MATERIALS AND METHODS

This research analysed the concept of "critical thinking", its characteristics, and its impact on students learning English through the method of analysis. Complementary methods such as comparison and generalisation were also employed. The study was conducted at Kyiv National Linguistic University (n.d.), which offers a program in "English Language and Literature, Second Foreign Language, Translation". The sample comprised 120 undergraduate students (third to fourth year) who had completed courses in linguistics and foreign language teaching methodology. Inclusion criteria involved sufficient proficiency in English, active participation in academic activities, and absence of academic debt. Exclusion criteria included significant absenteeism, lack of foundational critical thinking skills, and low academic performance. Thus, the sample consisted of students who met these criteria and could fully participate in the study. The study conformed to ethical standards as per the WMA Declaration of Helsinki (2025), with voluntary participation and adherence to confidentiality principles.

The development of critical thinking was examined using a SWOT analysis framework, systematically assessing strengths, weaknesses, opportunities, and threats to effectively implement corresponding strategies within the learning process. Both internal and external factors influencing

education were considered, with ongoing refinement based on collected data and outcomes. Key SWOT criteria included: instructor preparedness, alignment of the “English Philology” curriculum with contemporary standards, availability of modern teaching materials and resources, institution prestige, positive feedback from graduates and employers, involvement in research, development and implementation of innovative teaching methods, clarity of strategic development plans, use of analytical data for decision-making, and market demand for specialists with critical thinking skills.

Based on the SWOT analysis, important strategies for fostering critical thinking were identified and characterised. Students worked in groups to solve specific problems, promoting critical thinking skills development. They studied theoretical materials, collected information, discussed project execution strategies, and presented results to instructors and peers, receiving feedback. Digital tools such as Quizlet were utilised to create interactive flashcards and English language quizzes, enhancing language proficiency and supporting critical thinking through active repetition and self-assessment. Additionally, students used the Padlet platform to collaboratively create and discuss English-language resources, exploring diverse perspectives on linguistic issues, thereby fostering analytical approaches to learning material.

Throughout the course, students completed various project-based and discussion tasks aimed at developing both language competence and critical thinking. Project work included designing English advertising campaigns for hypothetical brands, creating grammar teaching materials for secondary school students, and producing short video lessons on specific grammar topics. Digital tools employed included Canva for visual content design, PowerPoint and Google Slides for presentation structuring, and video editing software for lesson creation. These tasks aimed to integrate linguistic, analytical, and presentation skills in practical applications.

Simultaneously, students participated in structured debates and discussions, following the Oxford debate format on topics such as “Social media causes more harm than good”, “Artificial intelligence will replace teachers”, and “Climate change should be addressed through global taxation”. Prior to debates, students prepared analytical summaries outlining key arguments and counterarguments supported by research and examples. Discussions were conducted exclusively in English; students worked in teams, allocated roles, and responded to questions from peers and instructors during and after presentations. Critical thinking development was indirectly assessed via successful task completion.

An assessment was carried out of the results of the completed tasks based on students’ success in performing the tasks, using a five-point grading system within each strategy, where 5 points represent a high level of task performance; 4 points indicate a well-executed task but with minor shortcomings; 3 points denote an acceptable task

performance with some deficiencies; 2 points mean the task was completed at a basic level with significant shortcomings; and 1 point signifies the task was performed poorly or not completed at all. Several recommendations were identified to improve the educational process aimed at developing critical thinking as a means to enhance the effectiveness of English language learning.

RESULTS

Key theoretical approaches, features, and requirements for developing critical thinking in students studying English

When learning a language, it is important not only to mechanically memorise words and rules but also to have the ability to analyse the context in which these words are used, as well as to critically evaluate information received from various sources. Studying English requires students to continuously engage with texts that may be literary, scientific, or media-related, which demands the ability to correctly interpret information, draw conclusions, and critically assess the knowledge acquired. In the process of learning English, critical thinking assists students not only in better understanding grammar, vocabulary, and phonetics but also in analysing how these language elements are used in real communicative situations. This enables students to use English more effectively to express their thoughts, participate in discussions, write essays, and undertake other forms of written work. Furthermore, critical thinking fosters the development of argumentative skills, which are an essential component of language learning. Students who can critically evaluate information are able to construct more logical and persuasive arguments, which are necessary for successful learning.

Moreover, the development of critical thinking in students learning English encourages the formation of an independent approach to study. They become more confident in their abilities, capable of independently finding information, analysing it, and drawing conclusions. This allows students not only to achieve high results in language learning but also to develop their capacity for self-reflection, which is important for personal and professional growth. Critical thinking also promotes the development of intercultural competence in students, as studying English includes not only grammar and vocabulary but also acquaintance with the cultural aspects of English-speaking countries. Students must be able to critically assess different cultural contexts, understand their differences, and take these factors into account when communicating in English (Dubovyk, 2024). Thus, critical thinking becomes the foundation not only for developing language skills but also for understanding the cultural particularities of other peoples, which is crucial for effective intercultural communication. In general, critical thinking is an integral part of the process of learning English, as it enables students not only to improve their language skills but also to develop analytical and cognitive abilities that are necessary for successful learning and personal development.

The educational-professional programme “English Philology” at Kyiv National Linguistic University envisages the development of students’ critical thinking through a complex of interconnected requirements and educational components. One of the primary aims of the programme is to develop the ability to analyse, evaluate, and interpret information, which facilitates an analytical approach to working with language material, critical reflection on translation strategies, and the scientific substantiation of linguistic phenomena. The first important aspect involves the design and implementation of disciplines focused on developing analytical and research skills. Students receive training in text analysis, interpretation of meanings, and recognition of logical connections between concepts, which cultivates the ability to critically assess texts of various genres and styles. Within the educational process, future philologists master methods of analysing literary, scientific, journalistic, and technical texts, helping them not only to broaden their professional competencies but also to improve their ability to systematise acquired knowledge and apply it in practical activities. The second key component of the programme is the integration of information technologies, which promotes the development of skills to critically evaluate and use modern information sources. During their studies, students become familiar with databases of scientific research, electronic libraries, language analysis software, and automated translation programmes. This not only enhances

their information literacy but also develops skills in selecting relevant information, verifying it, and systematising it – key elements of critical thinking. Special emphasis is also placed on forming a well-argued personal position and skills in conducting academic discussions. Students learn to construct logically sound reasoning, present convincing arguments, and evaluate the strengths and weaknesses of different viewpoints. This process is implemented through essay writing, critical reviews, analysis of scientific articles, preparing presentations, and participating in debates.

An important structural component of the programme is the inclusion of specialised courses aimed specifically at developing critical thinking. For example, the course “Foundations of Critical Thinking” is designed to cultivate students’ ability to reflect, evaluate alternative viewpoints, identify logical fallacies, and recognise manipulative techniques in texts. Interdisciplinary courses are also integrated into the curriculum, allowing students to analyse issues in linguistics, literary studies, and translation from various perspectives. Additionally, the programme promotes the development of general competencies, among which critical thinking is a key aspect. This is realised through the cultivation of problem-solving skills, the application of logical argumentation schemes, evaluation of the reliability of information sources, and decision-making based on analysis of facts and statistical data. A more detailed analysis of the programme is presented in Table 1.

Table 1. SWOT analysis of the educational programme “English Philology”

Strengths	Weaknesses
• high level of training of teachers with experience in developing critical thinking; • the curriculum is in line with modern requirements, which includes an analytical approach to linguistics and literary studies; • availability of the latest teaching materials and resources that promote the development of analytical thinking; • prestige of the educational institution and positive feedback from graduates and employers on the level of training; • the use of innovative teaching methods that support an analytical approach to the study of linguistic phenomena.	• insufficient number of integrated courses directly aimed at developing critical thinking; • limited access to some international scientific databases and resources used for analytical thinking; • lack of systematic assessment of students’ critical thinking in the educational process; • insufficient application of an interdisciplinary approach in the formation of critical thinking.
Opportunities	Threats
• active participation in international research on the development of critical thinking; • introducing new teaching methods based on the analysis and critical reflection of information; • expanding international cooperation with universities to exchange experience in teaching critical thinking; • use of analytical data to improve the educational process; • increased demand for professionals with developed critical thinking in the professional environment.	• high competition in the market of educational services, which requires continuous improvement of educational approaches; • the impact of information overload, which complicates the selection of quality learning resources; • insufficient motivation of students to develop critical thinking through traditional assessment methods; • limited funding for the introduction of new educational technologies.

Source: compiled by the author based on Kyiv National Linguistic University (n.d.)

Strengths of the program lie in its modern teaching approach, which combines classical and innovative methodologies. Instructors employ interactive strategies such as debates, analysis of authentic texts, case studies, and problem-based learning. This fosters the development of skills in argumentation, source evaluation, and forming

independent opinions based on factual data. A high level of methodological training among faculty and the implementation of advanced educational technologies enhances the effectiveness of the learning process. At the same time, certain weaknesses have been identified that may hinder the development of critical thinking among students. Despite

the availability of individual courses dedicated to analytical thinking, the systematic integration of this competency throughout all stages of learning remains insufficiently developed. The lack of regular assessment of students' critical thinking levels complicates the adjustment of educational approaches. Furthermore, unequal access to international academic resources may limit students' opportunities for independent research on current issues in philology and pedagogy. The analysis of the program's opportunities points to prospects for expanding international collaboration, which would promote the use of advanced methods for teaching critical thinking. Educational policy shifts and potential changes in national standards might lead to shifts in focus within the curriculum, complicating long-term planning for the development of critical thinking. Competition with other universities demands constant improvement of methodologies and approaches, while limited funding may constrain the implementation of new technological tools. Additionally, information overload typical of the modern educational environment may impede students' ability to distinguish reliable from unreliable information sources.

Thus, the educational-professional program "English Philology" ensures the development of critical thinking in students through a comprehensive approach that includes text analysis, the use of information technologies, the formation of reasoned positions, integration of specialised courses, and the development of general competencies. This contributes to the preparation of highly qualified specialists capable of deep information analysis, effective resolution of professional tasks, and independent decision-making in complex communicative situations. Overcoming potential threats is possible through strategic planning, adapting the curriculum to the demands of the educational environment, and continuous evaluation of the effectiveness of implemented methodologies.

Evaluation of strategies for developing critical thinking and identifying the most effective approaches for integration into English language learning

Based on the conducted SWOT analysis, key strategies for developing students' critical thinking were identified. To

assess their effectiveness in the process of learning English, a study involving 120 students engaged in various forms of work such as Project-Based Learning (Center for Teaching & Learning, n.d.), Problem-Based Learning (Leming, 2020), discussions and debates, as well as independent research and reflection, was carried out. Project-based learning, which involved students working on real projects such as developing advertising campaigns or creating teaching materials for English language instruction, proved to be highly effective in fostering critical thinking. Students were able to apply theoretical knowledge in practice, which allowed them not only to deepen their understanding but also to develop skills in independent analysis and decision-making. Regarding problem-based learning, students worked on solving specific problems such as developing methodological guides for teaching English or creating presentations on linguistic topics. This strategy facilitated group work, promoting the development of communication skills and collaborative problem-solving.

Students studied theoretical materials, discussed project execution strategies, and presented their results, which stimulated critical reflection on the learning content. Discussions and debates on topics such as the influence of culture on language or the role of English in globalisation served as tools for critical thinking development. Students analysed different viewpoints, prepared arguments to support their positions, and spoke before the group, fostering the ability to critically evaluate various approaches to problem-solving. Additionally, students conducted independent research, studying additional literature sources and analysing the obtained information. Regular reflection on their learning process enabled students to assess their achievements and identify areas for further development. Digital technologies such as Quizlet for creating flashcards and tests or Padlet for discussing English-language resources allowed students to actively engage in the learning process, improve language skills, and support critical thinking development through self-assessment. All results were summarised in Table 2, which presents the average scores for each learning strategy.

Table 2. Summarised results of student performance assessment according to learning strategies

Learning strategy	Main assessment criteria	Average score (max 5)
Project-based learning	Application of theory in practice, project quality, teamwork, presentation of results	4.2
Problem-based learning	Problem solving, depth of analysis, quality of group collaboration, presentation of results	3.8
Discussions and debates	Quality of argumentation, analytical ability, response to counterarguments, logical reasoning	4.0
Independent research and reflection	Independent information analysis, reflection on own achievements and mistakes	4.1
Use of digital technologies	Creation of flashcards, working with platforms (Quizlet, Padlet), active revision, linguistic analysis	4.0

Source: compiled by the author

The highest average score was recorded for project-based learning – 4.2 points. This indicated that involving students in real projects focused on the practical application of theoretical knowledge had a positive impact on their performance. Students demonstrated high quality in their completed projects, showed the ability to collaboratively solve tasks, worked effectively in teams, and presented their results at an appropriate level. Therefore, project-based learning contributed to the development of applied skills and ensured the formation of abilities to solve professional tasks in conditions close to real-life situations. A slightly lower but still high result – 4.1 points – was observed for tasks performed within the strategy of independent research and reflection. This suggested that autonomous research activities fostered the development of students' analytical thinking, their ability to deeply reflect on their own learning process, and independently analyse information. The completed tasks evidenced a sufficient level of students' research skills, including their ability to plan and implement educational projects independently. Discussions and debates yielded an average score of 4.0, confirming the effectiveness of this strategy in developing critical thinking, argumentation skills, and communication abilities. Students actively participated in group discussions, demonstrated the capacity to defend their own positions, analyse counterarguments, and logically structure their speeches. Engagement in debates contributed to the formation of public speaking skills and the ability to make quick decisions in dialogic settings. A similar average score of 4.0 was recorded for the use of digital technologies. This indicated students' adequate readiness to utilise information and communication technologies (ICT) in the learning process. Employing digital tools for creating educational materials, visualising information, and implementing project tasks enhanced learning efficiency by enabling students to better organise the study material and present their work results. It is also worth noting the positive impact of digital technologies on students' engagement and the development of their information competence. Problem-based learning showed the lowest average among the strategies studied – 3.8 points. This might indicate certain difficulties students faced when tackling complex learning problems. In particular, some students demonstrated insufficient depth in analysing problematic situations and encountered challenges in group collaboration. Nevertheless, even under these conditions, problem-based learning remained an effective means of developing analytical skills and the ability to find solutions in complex situations.

Overall, the research results indicated that the most effective strategies in terms of students' academic success were project-based learning and independent research with reflection. These strategies ensured deeper student involvement in the learning process and promoted the development of autonomy, critical thinking, and the ability to apply knowledge practically. Meanwhile, discussions, debates, and the use of digital technologies also positively influenced the formation of professional and communicative

competencies, increased student activity, and contributed to better assimilation of educational content.

Recommendations for implementing conceptual approaches in the learning process to enhance critical thinking among students studying English

Several recommendations were identified to improve the learning process aimed at developing critical thinking as a means to increase the effectiveness of learning English. These recommendations are addressed to students, teachers, and government bodies, encompassing both individual and general strategies that enable achieving high learning outcomes and fostering language skills development. An important aspect is not only improving students' language competence but also enhancing their ability to analyse, independently comprehend, and present their thoughts logically – skills essential for successfully using English in real-life situations. It is crucial to actively use interactive platforms such as Quizlet and Padlet. These tools help students develop not only language skills but also independent thinking abilities. Quizlet allows creating flashcards and quizzes that promote deeper comprehension through repetition and self-assessment. Using Padlet facilitates collective discussion of linguistic issues, forming an analytical approach to studying the material – an important component of critical thinking.

Students should be given opportunities to work in groups on real projects. For example, designing advertising campaigns in English or creating grammar teaching materials helps combine linguistic and analytical skills. A significant part of this work involves using modern digital tools such as Canva for creating visual materials and PowerPoint or Google Slides for presentations. Utilising these tools stimulates students to engage more deeply with the material and effectively apply their knowledge. To develop critical thinking, discussion and debate methods should be actively incorporated. The Oxford debate format enables students to discuss important social topics requiring analysis and argumentation. It is essential that students prepare analytical abstracts before debates, allowing them to develop skills in logical thinking and structured presentation of ideas. Additionally, discussing topics in English provides opportunities to practice language skills in real-life contexts. Such interactive methods will help students integrate critical thinking into their daily learning practice more easily. For teachers, it is important to provide regular feedback, helping students better understand their mistakes and develop self-monitoring skills. Using clear assessment criteria allows precise determination of each student's level of achievement and enhances the effectiveness of the learning process.

Furthermore, teachers conducting debates and utilising the aforementioned tools should participate in state-supported courses and programs, such as the Teacher Professional Development Program for Foreign Language Teachers organised by the Ministry of Education and Science of Ukraine titled "Remote English Language Learning Program for General Secondary Education Institutions"

(Order of the Ministry..., 2023) or courses conducted within Erasmus+ projects. These programs provide teachers with opportunities to master new teaching methodologies, including interactive and digital technologies that promote the development of critical thinking among students. Participation in such programs enables teachers to update their knowledge, enhance pedagogical skills, and implement innovative approaches to teaching English.

In addition to participating in professional development programmes, English language teachers can also take advantage of courses organised by international educational organisations such as the British Council. These courses offer up-to-date knowledge of the latest teaching methodologies, including the use of technology to foster students' critical thinking skills. The British Council, in particular, conducts training sessions where teachers can familiarise themselves with innovative approaches to teaching English and developing students' analytical abilities. They learn to use interactive tools such as videos, podcasts, and online games that help students critically evaluate information while enhancing their argumentation skills and expressive writing. Moreover, an important aspect of teachers' professional growth is engagement with online platforms such as Coursera or edX, where they can enrol in courses specialising in foreign language learning as well as critical thinking development. These resources provide access to courses from leading universities worldwide, such as Harvard University (n.d.) and Stanford University (n.d.), allowing teachers to acquire new knowledge and improve their qualifications in a format convenient for them. Participation in such courses enables teachers not only to become acquainted with best practices in foreign language teaching but also to develop new approaches to organisation.

Kyiv National Linguistic University should update its curricula to prioritise the integration of contemporary teaching methods that promote the development of critical thinking. It is essential to implement project-based learning, where students work on real-world tasks that require analytical approaches. Tasks such as creating advertising campaigns in English for hypothetical brands, developing educational materials for secondary school pupils, or producing grammar video lessons combine linguistic, analytical, and presentation skills. These tasks can be realised using tools like Canva for visual materials, PowerPoint or Google Slides for presentations, which not only foster critical thinking but also enable students to master necessary modern technologies. Furthermore, it is important to actively utilise online platforms for interactive student engagement. For example, Quizlet can be used to create flashcards and tests that assist students in improving their language skills while also developing critical thinking through active repetition and self-assessment. The Padlet platform can serve as an effective tool for collaborative work and discussion of linguistic issues, allowing students to cultivate an analytical approach to the material.

Regularly organising debates, particularly in the Oxford format, will help students enhance their logical

thinking, argumentation, and public speaking skills. Debate topics such as "Social media does more harm than good" or "Artificial intelligence will replace teachers" encourage students to develop skills in information gathering and analysis, as well as in formulating arguments and counterarguments – key components of critical thinking. Additionally, the university should develop a strategy for utilising digital technologies to support the learning process. This includes creating and upgrading infrastructure for distance learning, access to online courses, electronic libraries, and webinars. The use of the latest digital tools will enable students to acquire knowledge and skills in a more interactive and accessible format.

DISCUSSION

The findings of this study demonstrated that the development of critical thinking significantly impacts the effectiveness of English language learning, particularly in terms of material retention, students' ability to analyse information, and apply knowledge in practical situations. This aligns with the conclusions of J. Liu & A.J. bin Sihes (2025), who identified critical thinking as a key 21st-century skill in English language learning. They emphasised that critical thinking, English language learning in secondary and senior schools, and English reading instruction were among the most frequently used keywords in research. Various tools and methods are applied to foster critical thinking and improve the English learning process. Notably, platforms such as Canva serve as effective tools for creating interactive materials that support learning. This study notes that Canva can be used to create infographics, flashcards, and presentations, enhancing visual perception and analysis of information. This, in turn, assists students in developing critical thinking, as they engage with texts and visual materials to formulate conclusions and evaluate the presented information. This is also consistent with the findings of M.-P. Rodríguez-Rojas *et al.* (2024), who developed and validated a critical thinking scale for academic reading among students learning English. They reported that using tools like Padlet to create virtual boards for group discussions and collecting students' ideas facilitates more effective integration of critical thinking in the learning process. Padlet allows students to express their thoughts in real time, conduct discussions, and gather comments on texts, thus fostering analytical and communicative skills.

Z. Umarova & N. Zubaydova (2024) also investigated the role of critical thinking in English language development and concluded that integrating critical thinking into English teaching stimulates learning and promotes an analytical approach to language study. They utilised Google Classroom as a tool for creating online assignments where students could work with various materials, comment on texts, ask questions, and respond to prompts, thereby encouraging reflective thinking. The study by M.P. Arthi & S.N.S. Gandhimathi (2025) also highlighted the importance of structured assessment methods, such as SWOT analysis, which help evaluate the strengths and weaknesses

of the learning process. They note that this tool allows for identifying effective teaching strategies and opportunities to improve learning processes, including the use of Kahoot for assessing material retention. Kahoot enables interactive quizzes that motivate students to actively participate and instantly analyse information during lessons.

The results of this study confirmed that integrating digital learning platforms supports the development of students' critical thinking skills. Completing practical tasks, such as literary analysis or creating educational materials, helped students apply theoretical knowledge in practice and develop analytical abilities. This corresponds with findings by D.Yu. Kuposov *et al.* (2025), who demonstrated that a critically oriented approach to English language learning improves the cognitive skills of secondary school students. Similarly, V. Batdi *et al.* (2024) employed a mixed meta-analysis to evaluate the impact of critical thinking in instruction and confirmed its positive effect on students' academic achievements. Furthermore, this study found that problem-based learning enhances argumentation skills and independent decision-making. Students engaged in solving practical problems employed analytical thinking and showed a high level of understanding of the language material. This aligns with the findings of M.E. Nejad *et al.* (2022), who established that critical thinking plays a mediating role in the relationship between students' writing performance and their learning strategies. Research by G. Tillayeva & D. Mavlonova (2022) and Z. Yan (2021) also demonstrated that developing critical thinking among secondary school students promotes not only improved language skills but also the formation of general cognitive competencies essential for further education.

The results of this study demonstrated that the use of technologies to foster critical thinking in the process of learning English contributes to the enhancement of students' cognitive skills, increases their active participation in the learning process, and promotes the development of analytical abilities. This aligns with the findings of A. Schenck (2024), who investigated the relationship between technological tools and critical thinking among South Korean students learning English as a foreign language. His research confirmed that digital platforms and interactive tasks support the development of critical analysis and argumentation skills during language acquisition. The study also revealed that the use of digital technologies, specifically Quizlet and Padlet, positively influences the development of critical thinking. Students working with interactive platforms more frequently analysed and critically reflected on information by comparing different approaches to studying language material. This corresponds with the conclusions of Q. Huang *et al.* (2023), who demonstrated that critical thinking combined with learner engagement enhances success in foreign language learning.

Similarly, L.W.S. Merta *et al.* (2023) found that technological tools can stimulate the development of critical thinking in English language learning. J. Wei & H. Li (2024) also emphasised that ICT support in English

language teaching can improve students' critical thinking, which in turn increases learning effectiveness. Comparable conclusions were drawn by F. Tang (2024), and W. Liu & Y. Wang (2024), who studied the role of digital immersive technologies in English instruction. They discovered that using virtual reality (VR) and augmented reality (AR) tools fosters critical thinking, autonomous learning, and teamwork skills, making the educational process more efficient and sustainable. This is consistent with the findings of A.F. Shakil *et al.* (2021), who highlighted that applying critical thinking in university-level English teaching enhances the structure of students' written work and their ability to present ideas logically. It has been shown that students who actively apply critical thinking during learning demonstrate adequate language competence and confidence in expressing their own ideas.

The study's results indicated that analysing personal achievements and errors helped students better understand the learning process and identify areas for improvement. This is in line with Y. Jia's (2021) conclusions emphasising the importance of reflection in developing critical thinking during language learning. The research showed that participation in discussions and debates promotes a critical approach to analysing information and arguing one's point of view. This aligns with the findings of W. Liang & D. Fung (2021), who found that integrating critical thinking into teaching English as a second language significantly improves students' language competence. Similarly, S. Pošćić *et al.* (2023) emphasised that connecting to global educational platforms and implementing joint courses with foreign universities would provide students with access to a broader range of scientific materials and innovative teaching approaches. The use of digital technologies and artificial intelligence to analyse the learning process would allow for more precise adaptation of teaching strategies to students' needs. However, there are existing challenges that may affect the effectiveness of implementing these changes. Similar conclusions were drawn by H.A.E. Shamboul (2022), who noted that developing critical thinking in students not only enhances their cognitive skills but also increases their autonomy and independence in learning. His study also showed that the problem-based learning approach helps students better understand the material and find creative solutions to linguistic tasks. Moreover, the results indicated that the implementation of the flipped classroom method promotes a higher level of critical thinking among students, as they have more opportunities for analytical reflection on the material and active interaction during classes.

CONCLUSIONS

As a result of this study, a number of conceptual approaches and methodological foundations conducive to the effective development of critical thinking in the process of learning English were identified. In particular, it was established that critical thinking development has become an essential component of modern education, especially in the context of foreign language acquisition, including English. It was

determined that the educational-professional program “English Philology” demonstrated strengths through combining classical and innovative teaching methods, which contributed to the development of students’ analytical and critical skills. A high level of teachers’ methodological preparation and the introduction of advanced technologies enhanced the effectiveness of the learning process. However, certain weaknesses were identified, including insufficient integration of critical thinking development throughout all stages of learning and a lack of regular assessment of this aspect. It also emerged that students had unequal access to international scientific resources, limiting their opportunities for independent research of current issues. The program has potential for expanding international co-operation, which would provide students access to the latest methodologies and materials.

Various strategies for developing critical thinking applied in English learning were evaluated. Project-based learning demonstrated a high level of effectiveness, with an average score of 4.2, confirming its success in forming practical skills, teamwork abilities, and problem-solving capacities. This points to the importance of integrating project tasks oriented towards practical application of theoretical knowledge to foster critical thinking in students. This strategy enabled students not only to acquire new knowledge but also to successfully apply it in real-world contexts, promoting active development of analytical skills. Independent research and reflection also proved effective strategies, receiving an evaluation of 4.1 points, indicating a significant impact on the development of deep understanding and autonomous thinking. Through independent research, students gained skills in self-monitoring,

reflection, and analysis of their own learning process, which are essential components of critical thinking. Discussions and debates, although scored slightly lower at 4.0 points, also became powerful tools for developing argumentative skills and communication abilities. Students demonstrated the capacity to defend their viewpoints, analyse counter-arguments, and effectively present research findings. Engagement in such discussions fostered listening skills and understanding of alternative perspectives, an important element of critical thinking. Project-Based Learning, despite receiving the lowest average score (3.8), still proved useful in developing analytical skills and problem-solving abilities. However, some difficulties encountered by students during work on problem tasks indicate the need for greater support in resolving complex situations and integrating problem-based learning within more structured approaches.

Future research prospects include expanding the sample by involving students from various educational institutions and studying the long-term effects of identified strategies over the course of an academic year or several semesters, which would allow evaluation of their influence on the sustainable development of students’ analytical and research skills.

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REFERENCES

- [1] Arthi, M.P., & Gandhimathi, S.N.S. (2025). Research trends and network approach of critical thinking skills in English language teaching – a bibliometric analysis implementing R studio. *Heliyon*, 11(2), article number e42080. doi: 10.1016/j.heliyon.2025.e42080.
- [2] Batdi, V., Elaldi, Ş., Özçelik, C., Semerci, N., & Özkaya, Ö.M. (2024). Evaluation of the effectiveness of critical thinking training on critical thinking skills and academic achievement by using mixed-meta method. *Review of Education*, 12(3), article number e70001. doi: 10.1002/rev3.70001.
- [3] Center for Teaching & Learning. (n.d.). *Project-based learning*. Retrieved from <https://surl.li/lafclr>.
- [4] Dubovyk, O. (2024). Innovations in ESP teaching and learning practices. *Humanities Studios: Pedagogy, Psychology, Philosophy*, 12(4), 23-33. doi: 10.31548/hspedagog/4.2024.23.
- [5] Harvard University. (n.d.). Retrieved from <https://www.harvard.edu/>.
- [6] Huang, Q., Muhamad, M.M., Naw, N.R.B.C., & Li, W. (2023). A study on the impact of critical thinking skills and foreign language enjoyment on foreign language performance. *International Journal of Academic Research in Progressive Education and Development*, 12(3), 700-710. doi: 10.6007/IJARPED/v12-i3/18077.
- [7] Jia, Y. (2021). The development of critical thinking in language learning. In I. Roumbal & B. Chen (Eds.), *Proceedings of the 2nd international conference on language, communication and culture studies* (pp. 82-85). Dordrecht: Atlantis Press. doi: 10.2991/assehr.k.211025.013.
- [8] Johnson, C.M., & Howard, A.M. (2025). *Critical thinking for English-language learners: Reasoning, logic, and argumentation*. London: Routledge. doi: 10.4324/9781003473077.
- [9] Kaviani, M., & Heidari, D.M. (2020). The effectiveness of critical thinking on enhancing productive skills among Iranian EFL pre-intermediate learners. *Applied Research on English Language*, 9(3), 303-324. doi: 10.22108/ARE.2019.118748.1489.
- [10] Khan, S.I., Fazal, S., & Nazir, F. (2025). A qualitative study of prospective teachers’ perceptions about critical thinking skills before and after studying the functional English course. *SAGE Open*, 15(1), 1-16. doi: 10.1177/21582440241311153.

- [11] Koposov, D.Yu., Kanonik, N.P., & Strutynska, T.R. (2025). Methods for developing critical thinking through English language learning in higher education. *Academic Visions*, 40. doi: 10.5281/zenodo.15019710.
- [12] Kyiv National Linguistic University. (n.d.). Retrieved from <https://knlu.edu.ua/en/>.
- [13] Lailiyah, M., & Wediyantoro, P.L. (2021). Critical thinking in second language learning: Students' attitudes and beliefs. *International Journal of Language Education*, 5(3), 180-192. doi: 10.26858/ijole.v5i3.18350.
- [14] Lazorenko, L., & Krasnenko, O. (2020). Applying agile learning to teaching English for specific purposes. *International Journal of Learning, Teaching and Educational Research*, 19(9), 238-258. doi: 10.26803/ijlter.19.9.13.
- [15] Leming, M. (2020). *What is problem-based learning?* Retrieved from <https://surl.lu/xemsip>.
- [16] Liang, W., & Fung, D. (2021). Fostering critical thinking in English-as-a-second-language classrooms: Challenges and opportunities. *Thinking Skills and Creativity*, 39, article number 100769. doi: 10.1016/j.tsc.2020.100769.
- [17] Liu, J., & bin Sihes, A.J. (2025). Knowledge mapping of critical thinking in English teaching based on CNKI Scholar using CiteSpace. *Journal of Curriculum and Teaching*, 14(1), 119-133. doi: 10.5430/jct.v14n1p119.
- [18] Liu, W., & Wang, Y. (2024). The effects of using AI tools on critical thinking in English literature classes among EFL learners: An intervention study. *European Journal of Education*, 59(4), article number e12804. doi: 10.1111/ejed.12804.
- [19] Merta, L.W.S., Ratminingsih, N.M., & Budasi, I.G. (2023). The integration of technology in English language teaching to stimulate students' critical thinking. *Linguistic, Literature, and Culture*, 17(2), 333-341. doi: 10.15294/lc.v17i2.39097.
- [20] Moghadam, Z.B., Narafshan, M.H., & Tajadini, M. (2023). The effect of implementing a critical thinking intervention program on English language learners' critical thinking, reading comprehension, and classroom climate. *Asian Journal of Second and Foreign Language Education*, 8, article number 15. doi: 10.1186/s40862-023-00188-3.
- [21] Negoescu, A.G. (2023). The value of critical thinking in the language classroom. *Land Forces Academy Review*, 28(4), 303-308. doi: 10.2478/raft-2023-0036.
- [22] Nejad, M.E., Izadpanah, S., Namaziandost, E., & Rahbar, B. (2022). The mediating role of critical thinking abilities in the relationship between English as a foreign language learners' writing performance and their language learning strategies. *Frontiers in Psychology*, 13, article number 746445. doi: 10.3389/fpsyg.2022.746445.
- [23] Order of the Ministry of Education and Science of Ukraine No. 539 "On Approval of the Standard Program for Advanced Training of English Teachers of Secondary Education Institutions "Distance Learning English Language Program for Secondary Education Institutions". (2023, May). Retrieved from <https://surl.li/lvptiy>.
- [24] Poštić, S., Kriauciūnienė, R., & Ivancu, O. (2023). Viewpoints on the development of critical thinking skills in the process of foreign language teaching in higher education and the labor market. *Education Sciences*, 13(2), article number 152. doi: 10.3390/educsci13020152.
- [25] Rodríguez-Rojas, M.-P., Ramírez-Segura, A.-M., Valenzuela-Mora, P., Dampuré, J., & Munévar, F.R. (2024). Critical thinking evaluation scale: Design and validation in a Colombian population. *SAGE Open*, 14(4). doi: 10.1177/21582440241297418.
- [26] Schenck, A. (2024). Examining relationships between technology and critical thinking: A study of South Korean EFL learners. *Education Sciences*, 14(6), article number 652. doi: 10.3390/educsci14060652.
- [27] Shakil, A.F., Karim, R.A., Niazi, S., Aslam, M., & Khan, S.C. (2021). Critical thinking skills for English language classrooms at the university level. *Humanities & Social Sciences Reviews*, 9(2), 659-665. doi: 10.18510/hssr.2021.9262.
- [28] Shamboul, H.A.E. (2022). The importance of critical thinking on teaching learning process. *Open Journal of Social Sciences*, 10(1), 29-35. doi: 10.4236/jss.2022.101003.
- [29] Stanford University. (n.d.). Retrieved from <https://www.stanford.edu/>.
- [30] Tang, F. (2024). Understanding the role of digital immersive technology in educating the students of English language: Does it promote critical thinking and self-directed learning for achieving sustainability in education with the help of teamwork? *BMC Psychology*, 12, article number 144. doi: 10.1186/s40359-024-01636-6.
- [31] Tillayeva, G., & Mavlonova, D. (2022). *Improving critical thinking skills of English language learners in middle schools*. *Eurasian Scientific Herald*, 8, 266-269.
- [32] Turchyn, I., Smolikevych, N., & Zayachkivska, N. (2022). The development of critical thinking in the Ukrainian educational system using Paulo Freire's ideas. *Educational Practice and Theory*, 44(2), 27-43. doi: 10.7459/ept/44.2.04.
- [33] Umarova, Z., & Zubaydova, N. (2024). The role of critical thinking in English language development. *International Conference on Interdisciplinary Science*, 1(10), 239-244. doi: 10.5281/zenodo.13951612.
- [34] Wei, J., & Li, H. (2024). A systematic review of critical thinking development in information and communication technology-supported English as a foreign language teaching from 2015 to 2024. *Forum for Linguistic Studies*, 6(6), 990-1006. doi: 10.30564/fls.v6i6.7478.
- [35] WMA Declaration of Helsinki – Ethical Principles for Medical Research Involving Human Participants. (2025, April).. Retrieved from <https://www.wma.net/policies-post/wma-declaration-of-helsinki/>.
- [36] Yan, Z. (2021). English as a foreign language teachers' critical thinking ability and L2 students' classroom engagement. *Frontiers in Psychology*, 12, article number 773138. doi: 10.3389/fpsyg.2021.773138.

- [37] Yin, X., Saad, M.R.B.M., & Halim, H.B.A. (2023). A systematic review of critical thinking instructional pedagogies in EFL writing: What do we know from a decade of research. *Thinking Skills and Creativity*, 49, article number 101363. doi: [10.1016/j.tsc.2023.101363](https://doi.org/10.1016/j.tsc.2023.101363).
- [38] Zaitseva, N.V., Symonenko, S.V., & Osadchyi, V.V. (2022). A blended English for Specific Purposes course with the focus on critical thinking skills development for computer science students. *Journal of Physics: Conference Series*, 2288, article number 012037. doi: [10.1088/1742-6596/2288/1/012037](https://doi.org/10.1088/1742-6596/2288/1/012037).

Анжела Рибчинська

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Критичне мислення як засіб підвищення ефективності навчання англійської мови

Анотація. Метою дослідження було вивчити стратегії розвитку критичного мислення у студентів, зокрема в контексті навчання англійської мови, та визначити їх вплив на покращення навчальних результатів. У дослідженні були використані методи порівняння, прагматичний та метод узагальнення, а також стратегії проектно-орієнтованого навчання, проблемно-орієнтованого навчання, дискусій і дебатів, самостійного дослідження і рефлексії, а також використання цифрових технологій для розвитку критичного мислення. У дослідженні було з'ясовано, що розвиток критичного мислення серед студентів, які вивчають англійську мову, має важливе значення для підвищення ефективності їхнього навчання. Серед стратегій найвищі бали отримали проектне навчання (4,2 бали) та самостійне дослідження з рефлексією (4,1 бали), що свідчить про різну ефективність цих підходів у розвитку критичного мислення. Було визначено, що застосування проектно-орієнтованого та проблемно-орієнтованого навчання сприяє розвитку навичок аналізу, аргументації та вирішення реальних завдань, що безпосередньо пов'язано з критичним мисленням. Студенти активно брали участь у дискусіях, що допомогло їм удосконалювати вміння обґрунтовувати власні думки та сприймати різні точки зору. Також, використання цифрових інструментів, таких як Quizlet та Padlet, сприяло розвитку аналітичних навичок через інтерактивні вправи та групову роботу. В результаті дослідження було підтверджено, що інтеграція цих стратегій у навчальний процес позитивно впливає на здатність студентів критично осмислювати і застосовувати отримані знання. Дослідження дозволило викладачам впроваджувати ефективні стратегії для розвитку критичного мислення серед студентів, зокрема через проектно- та проблемно-орієнтоване навчання. Освітні установи можуть використовувати отримані результати для вдосконалення навчальних програм та підвищення якості підготовки майбутніх фахівців

Ключові слова: здобувачі освіти; навчальний процес; підготовка фахівців; ефективні стратегії; інтеграція технологій

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ICT competence of a school leader

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Abstract. The key mission of modernising the educational system is to develop a mechanism for the stable improvement of the modern educational system, ensuring its compliance with the norms of the 21st century, the social and economic needs of the country's development, the demands of society and the individual. Information and communication technologies are becoming the main tool to be used by people not only in professional activities, but also in everyday life. The purpose of this study was to emphasise the value of ICT competence in the activities of a school principal in the era of informatisation of education. The study employed such theoretical methods as analysis and generalisation. The advantages of having an ICT competence for a school principal, as well as the ways and methods of achieving it, were presented. Proficiency in information technology at the level of information culture, including the ability to formulate information needs, search for it, evaluate it, and use it effectively, is a necessary condition for the training of a highly qualified specialist. ICT competence is one of the crucial components of professional competence. The practical significance of this study lies in the fact that school principals can acquire new competences and develop a more comprehensive understanding of the effectiveness of their activities. The study discussed ICT competence and the advantages of having it, as well as issues related to its improvement. The findings of this study will contribute to the development of educational policy and the design of targeted professional training programmes for school leaders

Keywords: informatisation; modern school; management; quality of education; skills

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INTRODUCTION

As the informatisation of education intensifies, the role of the school principal is becoming increasingly more significant, as they must not only have modern ICT tools for management, but also actively introduce technology into the educational process to improve the efficiency and quality of education. The ICT competence of a school leader is a vital aspect that ensures the ability to effectively use information technology to make informed management decisions, organise learning, and improve the internal processes of an educational institution. Considering the high demands on educational leaders in the digital era, the study of the level and impact of school principals' ICT competence is critical for the development of strategies for professional growth and training of modern educational leaders.

According to M.M. Bachalapur & S. Manjunatha (2022), the use of information and communication technology (ICT) in education plays an essential role. Integration of ICT into both teaching and learning processes is one of the most practical solutions to educational reform. ICT competence of a school leader refers to their ability to effectively use information and communication technologies (ICT) in educational management, decision-making, and instructional leadership. According to J.J. Reang & R. Mohalik (2023), the relationship between transformational leadership styles and perceived levels of computer literacy is not always consistent. This is caused by a discrepancy in the perception of the competence of transformational leaders in relation to technology. Accordingly, based



on the reported connection between the perceived level of computer use and leadership style, the application of the components of transformational leadership for the principals of educational institutions in the context of Iran was proposed, for the purpose of transforming the educational institutions with the application of ICT. It is argued that principals who frequently utilise ICTs may lack the capacity to transform educational practices.

The school leader should feel at ease in an information environment and be able to effortlessly achieve the set specific pedagogical goals with the assistance of modern information technologies. This adds a new element to their professional training, their methodological skills – the element of “information culture”. It should organise, coordinate, and effectively manage practical work on the application of ICT in critical areas of activity of the educational institution. M.R. Gemma Rodriguez (2021) conducted a survey among school principals to analyse the current situation. The first part asked the demographic characteristics of the participants, i.e., gender, age, and educational level. The second part identified their ICT competences, which were divided into cognitive ability, skills, and attitudes. For this study, cognitive ability was defined by the participant’s knowledge and understanding of general computer uses. The skills being measured comprised Microsoft Office skills and internet and data management skills. Attitude was defined as their interest in ICT development for their schools and creating an ICT learning environment. The ICT competence of a school leader plays a crucial role in the effective management and modernisation of educational institutions.

Such decisions were made based on the results of another study conducted on ICT literacy. J. Anyanwu *et al.* (2021) noted that for an effective management of information system in a school organisation, certain levels of ICT competences are required of the principals. The competence factor plays a vital role in the implementation of management information systems, the competence of the user is hypothesised to be commensurate with the management information system applied by the organisation. Competence in this context is defined as a combination of awareness, skills and attitudes that enables an individual to perform a job to the standard required for successful performance in information management systems. It is imperative that all secondary school principals in the state acquire and embrace the use of ICT for the purpose of achieving efficient and effective administration in this digital age.

ICT competence is defined as a set of skills, knowledge, and attitudes that enable individuals to comprehend, utilise, and adapt to technological tools and digital resources. The term “ICT competence” is a broad one, encompassing a wide range of skills and abilities. These include word processing, presentation software, spreadsheets, email, internet usage, networking, communication, professional software applications, and digital tools. All these skills are considered to be essential for success in the contemporary digital world (Abdullahi *et al.*, 2020). V. Saienko *et al.* (2022) found that digital competence is a dynamic structured

combination of skills, knowledge, and ways of thinking in the field of information, communication, and digital technology. It affects the development of successful professional work, socialisation.

Thus, the purpose of the present study was to investigate the effects of ICT competence on school performance.

MATERIALS AND METHODS

This study was based on theoretical and empirical research. Theoretical methods such as generalisation and analysis were used. The study was based on a systematic and existing literature review that included the collection, analysis, and synthesis of existing academic works on ICT competence in educational leadership to measure the level of ICT competence of school leaders. Theoretical sources were studied, analysed, and conclusions were drawn. The findings obtained by other researchers and the experiments they conducted served as a basis for reflection on this topic. Specifically, the basis was experiments conducted in different countries over the past five years and their results. The studies cited and the specific findings were obtained during experimental work conducted among school leaders by researchers in countries such as New Zealand, Malaysia, and Nigeria.

The formulation of the problem and the recommendations made by various researchers for its solution were reviewed. To study this issue, the method of comparative analysis was employed. To create a theoretical basis and collect data, the study explored bibliographic databases such as ScienceDirect, Google Scholar, and ResearchGate. Studies that were relevant to the subject under study or analogous were analysed and the results were cited. Based on the searches, the keywords ICT in school management, ICT competences, and ICT competences in the activities of leaders were added. Thus, the method of analysing scientific literature was the preferred one. This approach allowed for a comprehensive understanding of the digital competences required for effective educational management. Additionally, the e-Leadership model was designed to investigate how digital technologies affected decision-making and school management. In this case, the data were analysed through articles covering journal articles and conference documents.

The analysis was conducted using a thematic approach, categorised into key competence areas such as digital literacy, ICT-based decision-making, cybersecurity awareness, and professional development strategies. By synthesising multiple theoretical perspectives, the study aimed to identify widespread challenges and best practices in ICT leadership. This methodological approach provided a comprehensive understanding of ICT competence among school leaders by combining theoretical models with empirical evidence. The analysis aimed to synthesise theoretical perspectives and empirical findings to develop a structured understanding of ICT competence in school leadership. To ensure ICT competence and up-to-date understanding in school management, published studies from no more than the last decade were analysed.

RESULTS AND DISCUSSION

The globalisation of education has already necessitated the application of digital technologies. Online platforms were available for conducting classes, sharing resources, doing the assessment, and managing the day-to-day activities of academic institutions (Haleem *et al.*, 2022). Information technologies are widely used in the modern education system to transfer information and ensure mutual communication between teachers and students. The main idea of the development of the school's information space is to purposefully develop and apply the latest technologies, change the educational process, making it more individual, high-quality, and efficient.

Being at the beginning stage of the School Management Information Systems, computerisation of the school management is the basic subject of modern school management (Demir, 2006). School management information systems have greatly improved over the last two decades and most of them incorporate several crucial functions required by school administration. However, every school has its specific needs (Shah, 2014; Aliksieieva, 2024). From a leadership perspective, this is a school culture where the school leader promotes ICT for planning, developing, and sharing teaching practices, where student-centred pedagogy prevails and leadership actions are taken systematically to foster digital competence among the staff (Ottestad, 2013). O.V. Ovcharuk & N.V. Soroko (2016) found that school education should consider the necessity of utilising ICT to surmount the challenges and obstacles that arise in the teaching of various subjects. This should include the strategies employed in developed countries regarding the role of ICT in lifelong learning and in the context of competence-oriented education.

While professional development for teachers overall seems to be an established functional system, the same cannot yet be said for the professional development of school leaders. Their possibilities of professional development are not as systematically established as those of teachers (Tulowitzki, 2015). Overall, the goal of developing the information space is to ensure the availability of innovative teaching materials, digital educational resources, educational resources on the Internet for school students and teachers. The use of these resources will enable students to master new teaching methods and organisational forms of the educational process, develop basic skills in schoolchildren, actively use multimedia tools and Internet technologies in lessons and extracurricular time, and direct the intellectual potential of students to positive development. This will pave the way for students to use computer technologies for educational purposes for comprehensive development, master ways to obtain information, and acquire skills such as continuing education throughout life. On the other hand, increasing teachers' ICT skills will improve the quality of the work of the school's scientific and methodological council, subject departments, and methodological associations, find an effective solution to the problem of effective use in the educational process, and individualise teachers' activities.

There is an increasing trend of teachers and administrators utilising technology in various aspects of their daily professional activities. There is a tremendous need for leadership in the use of technology to ensure that it makes a valuable and lasting contribution to education (Leong *et al.*, 2015). Implementing ICT into schools is the responsibility of the school principal, they must ensure that the best interests of the students are served through effective ICT infrastructure and professional development of the staff (Gronow, 2007). The informatisation of education has its specific goals. These include:

1. Creating favourable conditions for access to educational, scientific, and cultural information.
2. Intensifying interaction between participants in the pedagogical process using information technologies.
3. Changing the model of education management.
4. Improving the quality of education using ICT.

The administration of any system can be considered as a process of information processing, encompassing the interaction of its constituent subsystems and the exchange of information. A general education institution is an example of an open system, where a constant exchange of information occurs not only between the managing and managed subsystems, but also with the surrounding social environment. Based on the reality of the modern information society, it is evident that to achieve a certain level of information competence, a specialist must: constantly acquire new knowledge and skills in the field of information and communication technologies; develop their communicative and intellectual abilities; carry out interactive dialogue in a single information space.

School administrators play a crucial role in mediating the integration of technology into the educational system. Thus, a school head in this situation can either inhibit or facilitate the usage of computers in the classroom. Their attitude will determine the school's attitude towards technology as well (Amador & Amador, 2022). Methodological support and the use of information and communication technologies play a massive role in educational activities, and therefore it is crucial to have the opportunity to disseminate pedagogical experience in this area, making the necessary knowledge available to everyone. School administrators, particularly the school principals, should encourage the use of ICT in teaching and learning by giving teachers the freedom to design teaching and learning activities with the help of technology (Baharuldin *et al.*, 2019). Preliminary research indicates that ICT competence is a significant predictor of technology leadership behaviours, such as an inclination to promote new ICT initiatives (Bassellier *et al.*, 2003). A leader who has the capacity to utilise ICT competently will be able to introduce innovations in management, including effective school management, increase the motivation of the teaching staff, improve the school rating, and competently implement the IT policy. This is precisely why the following approaches can be found in the studies of some researchers.

M. Afshari *et al.* (2008) noted that the improvement of technology leadership is dependent on two key factors. Firstly, the principal must develop proficiency in the utilisation of technology. Secondly, they must provide leadership in its application for administrative, instructional, and learning functions. In fact, the principal must possess up-to-date knowledge in the domain of education. The effectiveness of the school principal's work is determined by professional competence in establishing the content of education, in ensuring the connection between education and the development of the individual, in the quality of education and its practical focus. The orientation of the school principal towards the personality-oriented goals of education is also an indicator of the improvement of professional competence. H.S. Lindsay *et al.* (2009) came to the following conclusion in their research. For ICT competence, both ICT knowledge and ICT experience (e.g., participation in ICT management and ICT projects) were investigated. The findings showed that ICT knowledge was linked to school leaders' intention to champion ICT in their schools. However, the findings did not provide support for the link between ICT experience and intention to champion. Thus, although school leaders appeared knowledgeable in most of the domains assessed, the study found that they were not as actively involved in ICT management and ICT projects, hence were limited in their "hands-on" experience with ICT management (Hassan *et al.*, 2020).

Furthermore, teachers' ICT competence is the quality of a specialist, formed throughout one's professional activities. It is also necessary to distinguish between ICT literacy and ICT competence. ICT literacy is determined as knowledge of what is a personal computer, software products, their functions, and capabilities, knowledge about the existence of computer networks (including the Internet). ICT competence is not only the use of various information tools (ICT literacy), but also its effective using in teaching activities. To form the basic ICT competence, one needs:

1. Development of positive motivation to use ICT.
2. Availability of ideas about PC operation and didactic capabilities of ICT.
3. Mastering the methodological foundations for visual and teaching materials using Microsoft Office (Dzhurylo & Shparyk, 2019).

Considering the prevailing theories concerning competences in this area, it is essential to pay particular attention to the theories that address the acquisition of such competences. In this case, it is necessary to turn to cognitive theory. Many distinct styles of leadership are suitable in attempting to integrate ICT in unique settings (Zahrl, 2002). Teaching methods have didactic functions, as they: familiarise learners with new material, enable them to strengthen the acquired knowledge, enable the control and assessment of the degree of knowledge mastery (Figurska & Sokol, 2016). Learning the material, understanding it, and applying the acquired knowledge is the process of knowledge acquisition. Knowledge is acquired by repeating, analysing, and applying it in practice. Thus, the process

of knowledge acquisition is based on the cognitive path. The acquisition process consists of four stages. Perception, understanding, consolidation, and application. The application stage here is related to practice and is the crucial stage. Only at this stage does the acquired knowledge become conscious, and the necessary skills and habits are formed (Huseynzade *et al.*, 2021).

These criteria and levels of knowledge acquisition found wide application in pedagogical practice and for scientific purposes in assessing the quality of knowledge acquisition. Information technology competence of manager is a personal formation that includes a motivational and value attitude towards the informatisation of management, information management, and software and technical knowledge and skills, professionally significant personal qualities (independence, creativity, reflexivity, lack of fear of using computer tools) and is manifested in the manager's ability to use a computer as a management resource (working definition). Despite the significance of ICT competence in the management of a school principal, it is evident that there is an absence of a systematic approach to this issue. The authors of the present study contend that the development of ICT competence in a manager is a process that enables not only the mastery of fundamental skills for working with technology, but also their integration into management practice. There are main stages of ICT competence:

1. The value of using ICT. Firstly, the manager understands the significance of information technologies for effective management. At this stage they analyse the advantages of using ICT in the educational or organisational process.
2. Training and basic skills. This includes the following daily tasks: mastery of the fundamentals of computer use, Internet navigation, office programme proficiency, and basic communication tools (e.g., email, messaging platforms, video conferencing systems).
3. Special tools and their integration into the management process. At this stage, the manager studies special systems used for management: electronic document management, planning and reporting systems, analytical tools. Having acquired the skills necessary, ICT is actively applied to daily management: automation of administrative processes, organisation of distance learning
4. Assessment of the effectiveness and optimisation of the use of technology. The manager analyses how successfully digital tools are used. At this stage, the outcomes are monitored and evaluated, the ICT implementation strategies are adjusted, experience is exchanged with colleagues, and adaptation to new requirements is carried out.
5. Leadership and digital culture. At the final stage, the manager, apart from using ICT to increase management efficiency, becomes an initiator of the development of digital skills among teachers. The creation of a digital culture in the enterprise promotes the continuous updating of knowledge and the implementation of innovative solutions.

These stages are interconnected, and the transition from one to another can be accompanied by continuous

self-education and adaptation to changes in the technological environment. This approach facilitates the establishment of a strategic foundation for sustainable development. This approach is analogous to the process of acquiring knowledge, and each stage corresponds to a cognitive process. The competence in the field of information technology and computing offers the possibility of creating new products and services which can markedly improve the quality of life and better living conditions (Atesh, 2013).

Thus, the ICT competence of a manager depends on the informatisation of society and education. If these processes are not adequately developed, the manager will be unable to demonstrate their expertise in this domain. The criterion of school prestige includes the social status of the school: participation of students and teachers of the school in competitions, olympiads, conferences, competitions; outflow of students to other educational institutions; admission of graduates to higher educational institutions. Satisfaction of students and their parents with the quality of education provided by the school: comfort, security of the student's personality, their attitude towards the main aspects of life at school; satisfaction of teachers with the content, organisation, and conditions of work; satisfaction of parents with the results and conditions of education and upbringing of their child, their place in the school community.

By analysing existing frameworks and best practices, the study identified the key digital skills needed by school leaders to foster innovation, support teachers, and improve student learning outcomes. It was proved that the modern school leader needs to have strong ICT skills to address the challenges of digital education, and that through effective use of technology, they can optimise school management, improve teaching and learning, and create a future-ready learning environment.

CONCLUSIONS

The study found that to become information competent, a person must be an active subject of communication

processes. The purpose of mastering information competence lies in the development of an active, independent, creative personality capable of self-fulfilment and self-actualisation. The information competence of the individual and the information competence of society are mutually developing objects that enrich each other. Thus, the personal level of information competence depends on the level of information competence of society, which is determined by the information competence of its members.

The study found that the ICT competence of a school leader is a set of knowledge, skills, and abilities necessary for the effective use of information and communication technologies (ICT) in management and educational activities. ICT competence is acquired through the search, analysis, systematisation, and use of information. Furthermore, this concept can also include information flow management, document management, digital security skills, data and personal data protection, and interaction with colleagues, parents, and students. The level of use of the latest information technologies in management falls behind the overall pace of informatisation of education. Specific opportunities and options for using the latest information technologies in the management of a mass general education institution require research, updating, and experimental testing. Prospects for further research include the development of in-service training programmes for school leaders in ICT competence, as well as the analysis of cybersecurity in schools and the development of tools for self-assessment of ICT competence of school leaders.

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REFERENCES

- [1] Abdullahi, Z.A., Mijinyawa, A., & Danladi, G.A. (2020). [Competency as an integral factor in the improvement of the head teachers' effectiveness in record keeping and school management](#). *International Journal of Research and Scientific Innovation (IJRSI)*, 7(1), 76-80.
- [2] Afshari, M., Kamariah, A.B., Luan, W.S., & Samah, B.A. (2008). [School leadership and information communication technology](#). *The Turkish Online Journal of Educational Technology – TOJET*, 7(4) 82-92.
- [3] Aliksieieva, H. (2024). Integration of digital technologies and artificial intelligence into the dual methodology of teaching bachelors of vocational education. *Scientia et Societas*, 3(1), 39-47. [doi: 10.69587/ss/1.2024.39](#).
- [4] Amador, R., & Amador, M.M. (2022). [School heads' attitude and competency towards information and communications technology](#). *International Journal of Advanced Multidisciplinary Research and Studies*, 2(6), 810-813.
- [5] Anyanwu, J., & Amafeula, N., & Anayeji, A. (2021). [Principals' ICT competencies: An imperative for management of information systems in public and private secondary schools in Anambra State](#). *International Journal of Innovative Science and Research Technology*, 6(12), 196-204.
- [6] Atesh, H. (2013). Information technology and learning environment in primary schools. In *3rd World conference on learning, teaching and educational leadership (WCLTA-2012)* (pp. 695-698). [doi: 10.1016/j.sbspro.2013.09.263](#).
- [7] Bachalapur, M.M., & Manjunatha, S. (2022). [ICT competency and attitude among faculty members related review of literature from the period 2012-2021](#). *Library Philosophy and Practice*, article number 6791.

- [8] Baharuldin, Z., Jamaluddin, Sh.B., & Shaharom, N.B. (2019). The role of school administrative support and primary school teachers' ICT literacy to integrate ICT into the classrooms in Pahang, Malaysia. *International Online Journal of Educational Leadership*, 3(1), 26-42. doi: [10.22452/iojel.vol3no1.3](https://doi.org/10.22452/iojel.vol3no1.3).
- [9] Bassellier, G., Benbasat, I., & Reich, B.H. (2003). The influence of business managers' IT competency on championing IT. *Information Systems Research*, 14(4), 317-336. doi: [10.1287/isre.14.4.317.24899](https://doi.org/10.1287/isre.14.4.317.24899).
- [10] Demir, K. (2006). [School management information systems in primary schools](#). *The Turkish Online Journal of Educational Technology*, 5(2), article number 6.
- [11] Dzhurylo, A.P., & Shparyk, O.M. (2019). ICT competency for secondary school teachers and students in the context of education informatization: Global experience and challenges for Ukraine. *Information Technologies and Learning Tools*, 70(2), 43-58. doi: [10.33407/itlt.v70i2.2438](https://doi.org/10.33407/itlt.v70i2.2438).
- [12] Figurska, I., & Sokol, A. (2016). The process of knowledge acquisition with the use of various teaching methods and its effect on the creativity of employees of the creative sector. *Mediterranean Journal of Social Sciences*, 7(6), 143-152. doi: [10.5901/mjss.2016.v7n6p143](https://doi.org/10.5901/mjss.2016.v7n6p143).
- [13] Gronow, M. (2007). [ICT leadership in school education](#). Sydney: The Sofitel Wentworth.
- [14] Haleem, A., Javaid, M., Qadri, A., & Suman, R. (2022). Understanding the role of digital technologies in education: A review. *Sustainable Operations and Computers*, 3(4), 275-285. doi: [10.1016/j.susoc.2022.05.004](https://doi.org/10.1016/j.susoc.2022.05.004).
- [15] Hassan, A.A., Waheeb, A.-U., El-Ebiary, Y.A.M.A., Abu-Ulbeh, W., Yusoff, M.H., & Pandey, B. (2020). [ICT and leadership styles-level of leadership competency of educational leaders](#). *Test Engineering and Management*, 83, 17077-17085.
- [16] Huseynzade, R.L., Azizova, Z.M., Aliyev, S.M., & Verdiyeva, U.M. (2021). *Pedagogy*. Baku: MUTARCIM.
- [17] Leong, M.W., Chua, Y.P., Sathiamoorthy, K., & Shafinaz, B.A.M. (2015). [Principal technology leadership practices and teacher acceptance of school management system](#). *Educational Leade*, 4, 89-103.
- [18] Lindsay, H.S., Annette, M.M., & Ulrich, R. (2009). School leaders, ICT competency and championing innovations. *Computers & Education*, 53(3), 733-741. doi: [10.1016/j.compedu.2009.04.013](https://doi.org/10.1016/j.compedu.2009.04.013).
- [19] Ottestad, G. (2013). School leadership for ICT and teachers' use of digital tools. *Nordic Journal of Digital Literacy*, 8(1-2), 107-125. doi: [10.18261/ISSN1891-943X-2013-01-02-07](https://doi.org/10.18261/ISSN1891-943X-2013-01-02-07).
- [20] Ovcharuk, O.V., & Soroko, N.V. (2016). [Information and communication competency development in education system: Modern studies and prospects](#). *Information Technologies and Learning Tools*, 51(1).
- [21] Reang, J.J., & Mohalik, R. (2023). [ICT competency of secondary school teachers](#). *International Journal of Creative Research Thoughts (IJCRT)*, 11(8), 351-358.
- [22] Gemma Rodriguez, M.R. (2021). Technology leadership: Assessing the competency level of high school administrators and teachers in the use of ICT. *Journal of Educational Management & Social Sciences (JEMSS)*, 1(1), 1-13. doi: [10.48112/jemss.v1i1.227](https://doi.org/10.48112/jemss.v1i1.227).
- [23] Saienko, V., Kurysh, N., & Siliutina, I. (2022). Digital competency of higher education applicants: New opportunities and challenges for future education. *Futurity Education*, 2(1), 45-54. doi: [10.57125/FED/2022.10.11.23](https://doi.org/10.57125/FED/2022.10.11.23).
- [24] Shah, M. (2014). Impact of management information systems (MIS) on school administration: What the literature says. *Procedia – Social and Behavioral Science*, 116, 2799-2804. doi: [10.1016/j.sbspro.2014.01.659](https://doi.org/10.1016/j.sbspro.2014.01.659).
- [25] Tulowitzki, P. (2015). The development of educational leadership and teaching professions in Germany. *Journal of Educational Cultural and Psychological Studies (ECPS Journal)*, 11, 45-55. doi: [10.7358/ecps-2015-011-tulo](https://doi.org/10.7358/ecps-2015-011-tulo).
- [26] Zahrl, G.S. (2002). Leadership of information technology in education. *Journal of Information Technology for Teacher Education*, 11(3), 245-251. doi: [10.1080/14759390200200135](https://doi.org/10.1080/14759390200200135).

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ІКТ-компетентність шкільного керівника

Анотація. Ключовою місією модернізації системи освіти є розробка механізму стабільного вдосконалення сучасної освітньої системи, забезпечення її відповідності нормам 21 століття, соціально-економічним потребам розвитку країни, запитам суспільства та особистості. Інформаційно-комунікаційні технології стають основним інструментом, яким користуються люди не лише у професійній діяльності, а й у повсякденному житті. Метою даного дослідження було підкреслити значення ІКТ-компетентності в діяльності директора школи в епоху інформатизації освіти. У дослідженні використано такі теоретичні методи, як аналіз та узагальнення. Представлено переваги володіння ІКТ-компетентністю для директора школи, а також шляхи та методи її досягнення. Володіння інформаційними технологіями на рівні інформаційної культури, що включає вміння формулювати потреби в інформації, здійснювати її пошук, оцінювати та ефективно використовувати, є необхідною умовою підготовки висококваліфікованого фахівця. ІКТ-компетентність є однією з найважливіших складових професійної компетентності. Практичне значення цього дослідження полягає в тому, що директори шкіл можуть набути нових компетенцій та розвинути більш комплексне розуміння ефективності своєї діяльності. У дослідженні було розглянуто ІКТ-компетентність та переваги її володіння, а також питання, пов'язані з її вдосконаленням. Результати дослідження сприятимуть розвитку освітньої політики та розробці цільових програм професійної підготовки керівників шкіл

Ключові слова: інформатизація; сучасна школа; управління; якість освіти; навички

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Integration of artificial intelligence into higher military education as a factor in increasing the efficiency of professional training

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Abstract. The study aimed to identify effective models and approaches to the integration of artificial intelligence technologies into the system of higher military education. The methodology of the study was based on theoretical analysis of scientific sources, content analysis of official documents, statistical reports and comparative analysis of national educational systems in the field of military training. The study determined that the use of artificial intelligence systems, including adaptive learning software, platforms with elements of virtual and augmented reality, as well as neuro-symbolic models of artificial intelligence, can increase the realism of training simulations, enhance the analytical training of students and improve the dynamics of learning. The analysis of current technological trends, according to which the military artificial intelligence market has been showing steady growth, accompanied by a growing need for specialists capable of effectively interacting with intelligent systems in operational conditions, was conducted. The analysis determined that the United States and the United Kingdom demonstrated the highest level of technological maturity and large-scale implementation of artificial intelligence in the educational process, while Germany followed a moderate but structured approach. Despite the challenges, Ukraine has shown a desire to innovate through the introduction of simulation solutions and adaptive technologies, subject to further government support and international partnership. The conclusions emphasised that the integration of artificial intelligence into higher military education is strategically important for all four countries, although it is implemented through different priorities and tools. The practical significance of the study is to develop recommendations for the digital renewal of military education in Ukraine, taking into account the successful international experience

Keywords: officer training; international experience; professional military education; augmented reality; artificial intelligence capabilities for knowledge assessment; personalised learning

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INTRODUCTION

Constant geopolitical challenges, the Russian-Ukrainian war and the rapid development of military technologies necessitate the transformation of the system of training military specialists. In this context, the integration of



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artificial intelligence (AI) into higher military education is of particular importance as a tool for modernising the educational process, enhancing the analytical and operational capabilities of future officers, and adapting the educational environment to the needs of modern combat. The countries of the North Atlantic Treaty Organisation (NATO), including the United States and European countries, have already developed practical models for implementing AI in military education. The need to ensure high-quality and technologically advanced training of officers in the face of hybrid and high-tech threats necessitates the introduction of the latest solutions, including AI, into the system of higher military education. Despite the active introduction of digital technologies into the military education systems of NATO countries, the level of integration of artificial intelligence into higher military education institutions (HMEIs) in Ukraine remains fragmented and insufficiently researched. There is a need to identify optimal models of AI application to improve the effectiveness of professional training of future officers, incorporating both national experience and practices of partner countries.

Much of the research focuses on analysing the potential of AI to optimise the learning process, automate assessment, and develop adaptive learning environments, including A.M.A. Alnaqbi & A.M. Yassin (2021), who examined the state of artificial intelligence and e-learning in the military education system of the United Arab Emirates, analysing existing practices, technological solutions, and organisational approaches in the context of educational challenges. The study identified several barriers, including a lack of technical infrastructure, poor staff training, and limited strategic vision. The study proposed multi-level strategies for modernisation, including updating policies, developing human capital, and introducing adaptive learning platforms. K. Bekpulatov (2024) analysed the experience of developed countries in the use of AI in military training. The study demonstrated the active use of simulation systems, decision support systems, and virtual training in the United States, the United Kingdom, and Israel. The study emphasised that AI in these countries has already become an element of strategic defence training and professional development of military personnel. C.A. Pfaff *et al.* (2023) analysed the issue of trust in AI among military experts in the US Armed Forces. The study determined that the effective integration of AI depends not only on the technological level but also on cultural and ethical aspects of perception. The study proposed a model for combining human expertise and AI in military decision-making.

The impact of AI on the management of pedagogical processes in military academies was studied by O. Zughoul *et al.* (2025). The study concluded that the integration of intelligent systems into pedagogy contributed to the personalisation of learning, improved monitoring of results and optimisation of schedules. The study emphasised that successful AI implementation requires changes in the management structure of institutions and training

of teaching staff to use digital technologies. V. Chmyr & N. Bhinder (2023) determined that most military higher education institutions demonstrate an insufficient level of digital transformation and have limited experience in using AI. The study proposed the concept of integrated learning using adaptive platforms and simulators that can model technical tasks in combat. J.G. Peacock *et al.* (2025) studied the integration of AI into military medical education and training. The study determined that the use of intelligent systems significantly improved medical training through emergency simulations and personalised learning paths. The researchers emphasised the importance of an interdisciplinary approach to the implementation of AI in medical training in combat situations. J.R. Spirnak & S. Antani (2024) emphasised the need to introduce AI training content into military medical education. The study determined that most medical curricula of the Armed Forces do not cover key aspects of AI, which creates a gap in the training of future military doctors. The study proposed an AI integration framework that would include the basics of machine learning, medical image analysis, and ethical aspects of using intelligent systems.

K. Bondar (2024) studied the military artificial intelligence system in Ukraine. The study identified key actors, from government agencies to private companies, and analysed challenges, including insufficient funding and a lack of agreed standards. The study demonstrated Ukraine's potential to create a hybrid model of AI implementation in the military sphere. M. Onderco (2025) analysed the impact of the conflict in Ukraine on the formation of NATO's military AI strategies. The study stressed that real-life combat conditions have accelerated the need for standardisation and international regulation of autonomous systems. The study also noted that NATO should strengthen its role in ensuring the ethical and safe use of AI in the armed forces. O. Trofymenko *et al.* (2024) analysed the role of artificial intelligence in modern military strategies and technological systems. The study determined that AI is increasingly being used in battle management systems, cybersecurity, and autonomous platforms. They also highlighted regulatory issues and emphasised the need to develop a unified ethical policy on the use of AI in the military. The studies mainly emphasise the potential of AI and general strategies for its integration but did not sufficiently reveal the practical results of implementing AI in the daily educational process of military academies. There was also a lack of empirical data on the impact of AI on the development of professional competencies.

The study aimed to identify effective approaches and models for integrating artificial intelligence into the system of higher military education, based on a comparative analysis of the experience of Ukraine, the USA, the UK and Germany. The objectives of the study were to analyse the theoretical foundations and conceptual approaches to the introduction of artificial intelligence into higher military education in the context of the current security situation and technological development; to conduct a comparative

analysis of the level and forms of AI use in the professional training of military personnel in higher military education institutions of Ukraine, the USA, the UK and Germany; to process and summarise statistical data on the dynamics and effectiveness of AI implementation in military education.

MATERIALS AND METHODS

The study was theoretical in nature and aimed at identifying current trends, opportunities and effectiveness of introducing artificial intelligence technologies into the system of higher military education, as well as analysing the experience of different countries in using intelligent technologies for training military personnel, in the context of Ukraine, the USA, the UK and Germany. The choice of these countries is due to both the relevance of the topic for Ukraine in the context of war and the availability of best practices in the implementation of AI in defence education in the United States, the United Kingdom and Germany, which are technologically advanced countries and NATO members. The timeframe covered the period from 2020 to 2024, which traced the dynamics of the digital transformation of the educational process in military institutions and identified key stages of digital infrastructure development.

The study collected secondary data from official sources, including reports: International Committee of the Red Cross (2024), "Artificial Intelligence in Military Statistics and Facts" (Pangarkar, 2025), as well as analysis of documents, in particular JSP 936: Dependable artificial intelligence (AI) in defence (part 1: Directive) (Ministry of Defence, 2024). Additionally, academic publications were analysed (Borchert *et al.*, 2024), as well as selected materials from expert interviews and industry reports, including Defence Advanced Research Projects Agency (n.d.; 2025) and HGXR (2024). Statistical indicators on the introduction of AI in the educational process of military academies, in the areas of combat simulation, cybersecurity, intelligence processing and automated assessment, were emphasised (Pangarkar, 2025).

Three key research methods were used. Theoretical analysis (in particular, content analysis of scientific literature) was used to systematise the main conceptual approaches to the integration of AI into military education. It identified priority areas of digitalisation, to identify leading models of innovative technologies implementation and to assess the degree of their impact on teaching methods and the organisation of the educational process in military universities. Next, a comparative analysis was used to compare the level and forms of AI integration in military education in Ukraine, the USA, the UK and Germany. The analysis covered such aspects as the extent of the introduction of training simulators, the functioning of adaptive learning platforms, the use of automated assessment systems, and the level of funding for innovative educational initiatives in the military sphere. The analysis of statistical data was conducted using Microsoft Excel (version 2021), using descriptive statistics, which summarised the quantitative indicators of AI implementation in military education and

identified statistically significant relationships between key parameters. The Wald criterion was used to assess the statistical significance of the impact of funding on the level of innovation. This criterion was used to test the hypothesis: does the amount of funding affect the scale of AI applications in these countries? The article summarised the indicators of coverage of higher military educational institutions by digital technologies, traces the change in the intensity of AI use in education, and establishes the correlation between the level of innovation integration and the effectiveness of military training.

RESULTS AND DISCUSSION

Theoretical and methodological foundations of artificial intelligence integration into higher military education

The integration of AI into military education is becoming an important component of the digital transformation of the educational environment, which aims to increase the effectiveness of training military specialists in the context of growing demands for technical literacy, adaptability and the ability to act in conditions of information and cognitive complexity. Priority areas of digitalisation of military education have been identified. These include:

- use of intelligent simulators and virtual trainers to model combat situations in augmented and virtual reality environments;
- implementation of adaptive learning systems that incorporate the individual pace and style of learning;
- creating digital platforms for developing teamwork and management skills;
- application of technologies for analysing the behaviour and cognitive state of cadets to detect stress, fatigue and a decrease in the level of engagement in training promptly.

All the areas aim to improve the efficiency of the educational process, optimising the workload and increasing the level of psychological resilience of future military professionals. The integration of artificial intelligence into the military education system demonstrates a strategic multi-vector focus not only on combat training but also on the protection of information space, operational intelligence analysis, individualisation of training and support of logistics processes. These tools are being continuously introduced into various aspects of military training. Figure 1 shows the general trend in the distribution of AI applications in this area.

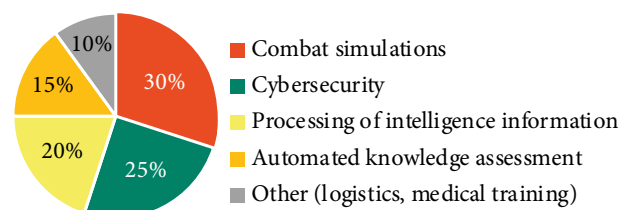


Figure 1. Areas of AI application in military education
Source: compiled by the authors based on the International Committee of the Red Cross (2024)

The structure of the use of artificial intelligence in military education indicates a reorientation of educational programmes towards technologically advanced and adaptive solutions that can prepare personnel for the challenges of modern warfare. Simulation technologies receive the most attention, covering 30% of all applications. They provide simulations of complex combat situations in a secure environment and can be used for tactical thinking and operational response without the need to physically deploy resources. This dominance of simulations is explained not only by their effectiveness but also by the growing need for adaptive training in the face of dynamic threats. Cybersecurity accounts for a significant share of 25%, which logically follows from the relevance of information and hybrid threats. The introduction of augmented reality to protect the digital infrastructures of military educational institutions not only improves efficiency of response to attacks but also ensures proactive identification of system vulnerabilities. At the same time, intelligence processing, which accounts for 20%, is becoming a critical analytical tool to support strategic planning and operational decision-making, especially in multi-domain operations and the need to quickly process large amounts of data. Automated knowledge assessment accounts for 15% of the market and is gradually gaining traction as a means of individualising the educational process. Such systems can be used to accurately track cadets' progress, quickly identify educational gaps and automatically adapt training goals, which increases the efficiency of training without additional burden on teachers. Lastly, the residual segment of 10% covers ancillary services, including logistics and medical training. This indicates the gradual integration of AI into related functions that support the combat readiness and resilience of military structures in general.

The analysis of conceptual approaches identified four key paradigms. The first is the technology-oriented approach, which involves using AI as a tool to automate routine educational processes, including testing, simulations, processing educational data, and providing feedback to cadets. The second is the pedagogical and adaptive approach, according to which artificial intelligence is seen as a tool for personalising learning, creating individual trajectories and predicting educational outcomes. The third is a strategic and innovative approach focused on transforming the educational paradigm in general, through the creation of collective decision-making systems, simulation of combat scenarios, and training in teamwork using intelligent technologies. The fourth is the security and ethical and legal approach, which focuses on cybersecurity, decision-making autonomy, legal responsibility in the use of AI and ethical aspects of human-machine interaction in military education.

In the context of the introduction of innovative technologies, several models for integrating AI into military education were identified. The first is the human + AI model, in which teachers work in tandem with digital assistants that automate assessments, provide individual recommendations and provide real-time feedback. The second is the

AI-enhanced blended learning model, which combines traditional forms of education with adaptive digital platforms. The third model is the full digitalisation of the learning process, which is typical for specialised programmes, such as cybersecurity, where learning takes place in virtual environments with offline monitoring of learning progress. The fourth model is institutionalised implementation, which involves the creation of specialised centres for the development and implementation of AI technologies for the educational and research process within military universities. An assessment of the impact of AI on teaching methods and the organisation of the educational process shows significant transformations in three key areas. First, the teaching methodology is changing due to the introduction of adaptive platforms, interactive visualisation of complex material, and individualised approaches to knowledge acquisition. Secondly, the organisation of the educational process is optimised by automating the timetable, monitoring educational outcomes, and integrating online courses and digital classrooms. Thirdly, the use of cognitive interfaces and emotional monitoring systems enables better psychological and pedagogical support for cadets, which increases moral and psychological stability and reduces the risk of professional burnout.

The results of the study demonstrated that the integration of artificial intelligence into higher military education significantly increases the effectiveness of professional training of future military specialists, through adaptive learning, virtual modelling of combat situations and improvement of cadets' analytical skills. This is consistent with the findings of H. Putra & B.E. Mulyono (2024), noting that the use of AI in military education contributes to the formation of operational thinking and risk reduction in real-world conditions, although also highlighting the need for ethical control over the implementation of such technologies. The use of AI systems in military training contributes to the creation of adaptive learning environments in which complex tactical situations can be modelled with a high level of realism (Hagos & Rawat, 2024). Importantly, by combining neural processing with logical rules, such models can embed the ethical and legal constraints necessary to train military professionals in a modern environment that requires not only technical literacy but also a deep understanding of the humanitarian aspects of warfare. In addition, D.H. Hagos & D.B. Rawat (2024) determined that neuro-symbolic AI can be central in improving military education courses aimed at developing critical thinking, situation analysis, risk management, and real-time decision-making. This opens new prospects for training commanders who can effectively interact with autonomous systems, control combat management processes, and adapt to the complex and changing conditions of the modern battlefield.

The introduction of virtual simulation systems based on artificial intelligence algorithms can be used by cadets to develop strategic planning skills more effectively. This correlates with the study by Y. Kim (2021), who proved

the effectiveness of AI simulations for modelling combat scenarios in military academies in the Republic of Korea, which accelerated the adaptation of future officers to non-standard situations. Moreover, it is possible to increase the motivation of cadets to study due to the interactivity and personalisation of the learning process provided by AI. This was confirmed by A.T. Biggs (2025), stressing that adaptive learning systems based on AI can be used to account for the individual learning style of each cadet, which, in turn, improves training results and the level of material assimilation. This information is complemented by the work of J.E.M. Díaz (2024), which recorded an improvement in the critical thinking skills of cadets trained using AI tools, especially through decision analysis and machine learning systems. Therefore, the use of AI in military education contributes to the development of the ability to make decisions based on many variables in a short time, which is especially important in combat situations. It is also possible to reduce the workload of teaching staff by automating part of the learning process, including assessment and feedback. This is supported by the findings of A.B. Rashid & M.A.K. Kausik (2024), who highlighted the potential of AI in automating routine educational tasks in various fields, including the military.

Notably, there are also challenges associated with the introduction of AI in military education, including technical limitations, risks of confidential data leakage and dependence on digital systems. Similar warnings are present in the study by J. Black *et al.* (2024), which states that the strategic use of AI in the military should be accompanied by the development of security protocols and backup procedures in case of cyberattacks. Excessive automation of training can lead to a decrease in interpersonal interaction. This result correlates with the study by P. Kelly & H. Smith (2024), noting that the integration of generative AI should be accompanied by a lively dialogue between participants in the educational process to preserve the values of teamwork. Furthermore, the use of AI can contribute to the development of new professional competencies in the military, in the areas of big data analysis, cybersecurity, and information systems management. This correlates with the findings of J. Savelka *et al.* (2025), proving that the development of rapid training methods using AI can be used to form a competitive workforce capable of responding dynamically to technological challenges.

Thus, the unique experience of introducing artificial intelligence into higher military education is that this process not only transforms traditional approaches to military training, but also creates a fundamentally new educational ecosystem where knowledge, adaptability and digital competence are formed simultaneously. Thanks to simulation platforms, cognitive monitoring and big data analysis, future officers acquire skills in reflective thinking, strategic planning and rapid response to multidimensional threats. This contributes to the emergence of a new type of military specialist – not only technically armed, but also ethically conscious, resistant to information attacks and capable of

rapid adaptation in a changing combat environment. Thus, the integration of AI into military education is not just a modernisation of the educational process, but a step towards the formation of an intelligent army of the future, where the main value will remain human.

Assessment of the use of AI in military education and comparative analysis of the experience of its integration in Ukraine, Germany, the USA and the UK

According to the analytical report by T. Pangarkar (2025), the introduction of artificial intelligence in the military sphere is one of the key trends in modern technological development, which demonstrates steady growth and significant impact on various aspects of defence activities. The use of intelligent technologies is increasingly being integrated into military strategies, tactical operations, and logistics management, as well as into education and combat training systems.

Statistics show that the global AI market in the military sector is growing dynamically: from 7.9 billion USD in 2022, it increased to 8.9 billion USD in 2023. According to forecasts, by 2032, this market could reach 24.7 billion USD, corresponding to a compound annual growth rate (CAGR) of 12.4% between 2023 and 2032. This growth is driven by both increased investment from public and private defence entities and growing global demand for automated and intelligent military solutions. Structurally, the AI market in the military sector is divided into several main components. Software accounts for the largest share, playing a leading role in the implementation of algorithmic systems based on machine learning, neural networks and forecasting. Revenue in this segment is projected to reach 10.52 billion USD by 2032. At the same time, hardware and related services are also showing steady growth. By 2032, these segments could generate 8.00 billion USD and 6.18 billion USD, respectively. This trend indicates a growing need for technical resources to support AI systems, as well as accompanying services, including technical support, consulting, and cybersecurity. An analysis of the market by type of military platform shows that space platforms account for the largest share (33%). This highlights the growing role of satellite technologies, which are critical for global surveillance, reconnaissance, navigation and communications. Ground platforms account for 29% of the market, air platforms for 21%, and maritime platforms for 17%. This distribution indicates that artificial intelligence is being implemented in virtually all domains of modern warfare, ensuring adaptation to a variety of combat scenarios (Pangarkar, 2025).

The integration of AI into military education and training deserves special attention. In this context, the latest technologies, including virtual and augmented reality systems powered by artificial intelligence, are actively used to create adaptive, realistic and safe learning environments. This makes it possible to simulate combat situations, optimise decision-making and develop critical thinking in military personnel without risking their lives. The use of such

tools significantly increases the effectiveness of training, reduces training costs and promotes an innovation-oriented approach to the professional development of the military. At the same time, despite the positive dynamics of development, the introduction of AI technologies in the military sphere is accompanied by several challenges. According to the report by T. Pangarkar (2025), 59% of respondents point to the shortage of qualified data analysts as a key obstacle to the introduction of relevant technologies. An even more substantial challenge is the issue of transparency and ethics: 76% of executives express concern about potential data bias and the lack of transparent algorithms in AI systems. This requires the development of clear regulations, professional training, and ongoing monitoring of implemented solutions.

In the context of the transformation of military education, the introduction of artificial intelligence tools that change both the forms of training and the content of the educational process is becoming increasingly important. The integration of AI can enhance individualisation of learning, provide flexible management of educational trajectories and improve the assessment process. In the

period from 2020 to 2024, the digital transformation of the educational process in military institutions gained rapid momentum in several countries. International experience demonstrates a variety of approaches to the introduction of digital technologies in the military sphere, which is driven by both technical capabilities and political priorities. A comparison of the practices of four countries, namely Ukraine, the United States, the United Kingdom, and Germany, identified the strengths, challenges, and trends in the development of digital education in the military context. The analysis addressed four key aspects: the extent of use of augmented reality-based training simulators, the functioning of adaptive learning platforms, the use of automated assessment systems, and the level of funding for innovative initiatives. The assessment of these components helps to identify the degree of technological maturity of each country in the field of digital transformation of military education. Comparison of these parameters not only identified best practices but also assessed the possibility of adaptation to Ukrainian realities. Table 1 presents comparative characteristics of the introduction of AI in military education in the context of these countries.

Table 1. Comparative analysis of AI integration in military education

Country	Training simulators with AI	Adaptive learning platforms	Automated knowledge assessment	Financing innovation in defence education
Ukraine	Limited use; used mainly in pilot projects at military academies	Partial testing of adaptive platforms, including in cooperation with private IT companies	Use at entry level; depends on human factors	Low level of public funding; dependence on international assistance
USA	Large-scale implementation in all branches of the armed forces; active use of VR/AR with AI	Developed a network of adaptive systems (e.g. DARPA)	Widespread use in testing, skills assessment, progress forecasting	High level of funding (billions of dollars in budgets through the Defence Advanced Research Projects Agency (n.d.; 2025), etc.)
Great Britain	High level of integration, including multi-agent simulations	Adaptive learning environments are in place (e.g., as part of the Defence Learning Environment programme (Ministry of Defence, 2024))	Automated systems are partially implemented, considering ethical standards	Stable funding through the Ministry of Defence; cooperation with universities
Germany	Medium level of application; focuses on command-and-control training	Tested in selected military schools; emphasis on data security	Pilot systems in place; focus on accuracy and reliability	Moderate funding; emphasis on integration with civilian research institutions

Source: compiled by the authors based on J. Freeman & W. Zachary (2018), E.H. Christie (2022), H. Putra & B.E. Mulyono (2024), S. Ding *et al.* (2025)

A comparative analysis of the integration of artificial intelligence into military education demonstrated significant differences between countries both in terms of the scale of implementation of relevant technologies and the depth of their adaptation to national educational and defence contexts. In the United States of America, AI is being introduced into the educational processes of military academies and training institutes as part of systemic government programs and targeted initiatives funded and coordinated by the Defense Advanced Research Projects

Agency and the US Department of Defense. In particular, the Defence Advanced Research Projects Agency (2025) competition titled AI Tools for Adult Learning involves a multi-phase competitive selection system and provides funding of up to 750,000 USD. These funds aimed to support the development of innovative adaptive learning tools for defence professionals. Participants in the competition will receive funding to create prototypes of intelligent learning platforms that can analyse the individual educational needs of cadets in real time and adapt the

content of training modules accordingly. In parallel, the ENGAGE programme (Defence Advanced Research Projects Agency, n.d.) addressed the development of new methods for mass evaluation of the effectiveness of blended learning formats, including offline models, virtual classrooms and simulations. The use of large amounts of data within this programme objectively tracked learning progress for thousands of cadets simultaneously, as well as automated generation of individual learning trajectories to train highly qualified officers capable of operating in a rapidly changing digital battlefield. The United States demonstrates strategic consistency in the process of digitalising military education. An example is the activities of the US Military Academy at West Point, which is actively implementing new curricula focused on developing officer competencies necessary for effective performance of tasks in the digital environment. The main emphasis in the educational process is on the study of autonomous systems, artificial intelligence, and big data analysis, as well as the basics of cybersecurity and artificial intelligence modelling (Gilland & Reeves, 2024). Such an interdisciplinary approach ensures the training of personnel capable of operating in the context of hybrid warfare, cyber threats and information confrontation. In addition, the US Department of Defence at the state level supports the development of the concept of adaptive learning, which includes the introduction of intelligent decision support systems based on artificial intelligence. These systems are used both in classroom training and in the field, forming a new standard of combat training focused on individual characteristics and real-time knowledge updating.

The British approach to the integration of artificial intelligence into military education is characterised by a combination of a developed regulatory framework and innovative technological solutions implemented within the defence learning environment (DLE). The key regulatory document in this area is JSP 936 (Ministry of Defence, 2024), which sets out the minimum requirements for personnel training to ensure the safe, ethical and effective use of artificial intelligence technologies. According to this document, all specialists involved in military activities must undergo mandatory training through the DLE, which provides access to modular online courses, interactive simulations, videos, and testing with automated assessment of the level of skills mastery. It is also worth noting the active cooperation of the UK Ministry of Defence with the private sector. In particular, the startup Hadean has developed a generative language model that is integrated into the British army's virtual simulators to create an adaptive "human environment". This technology enables simulators to dynamically respond to the actions of cadets, bringing training situations closer to the realities of the modern battlefield and at the same time increasing the cognitive complexity of training. The UK's military education policy is being transformed in response to the strategic challenges of modern defence doctrine, which emphasises the need for technological dominance in future conflicts. The All-Party

Parliamentary Groups report (2023) emphasises that future commanders must have basic competencies in artificial intelligence, algorithmic thinking and digital operations management. On such basis, it is recommended to include relevant training modules in officer programmes, as well as to create interdisciplinary training centres at the intersection of defence and IT with the involvement of relevant experts.

In the Federal Republic of Germany, the integration of artificial intelligence into military education is based on a science-based approach and a moderate incremental strategy. The concept of Master and Servant, which has become widespread among German defence researchers, emphasises that AI should remain a "servant", i.e. a tool fully controlled by humans. The focus is on the application of AI in C4ISR (command, control, communications, computers, intelligence, surveillance and reconnaissance) systems and open-source analytics (Borchert *et al.*, 2024). A significant portion of defence innovation funding, approximately 50 million EUR annually, is directed to the development of AI-enhanced early warning systems and the application of intelligent visual data processing in the field of missile technology. At the same time, the content of military education is being adapted: The Bundeswehr Command and Staff College and the Bundeswehr University Hamburg are revising their curricula to include specialised courses in artificial intelligence and launching new bachelor's and master's degree programmes with relevant profile (HGXR, 2024). In the context of the digitalisation of military training, Germany demonstrates the effective implementation of VR/AR technologies. Virtual parachute jump simulators are used in the training of airborne units, which can significantly reduce training costs and minimise the risk of injury. Such solutions provide a high level of realism in combat scenarios, contributing to the development of operational decision-making skills in a dynamic environment (CPM Defence Network, 2024). Germany's digital infrastructure for military education is also gradually integrating AI technologies into the processes of feedback and assessment of learning outcomes, providing more accurate and adaptive monitoring of cadets' and officers' progress at all stages of their training.

In Ukraine, the digitalisation of military education began to develop rapidly in the context of a full-scale invasion (since 2022), which created an urgent need to introduce the latest approaches to personnel training. Even though Ukrainian military academies do not yet have full-fledged AI courses, in 2024 the Ministry of Defence of Ukraine initiated a competition for the development of VR/AR simulators using AI for comprehensive training of military personnel, including in urban combat, casualty evacuation, and reconnaissance scenarios (Ministry of Defence of Ukraine, 2024). Ukraine's participation in the North Atlantic Treaty Organisation's Defence Education Enhancement Programme (DEEP) (2025), which aims to modernise curricula, develop distance learning courses and implement NATO standards in the military training system, remains an important component of digital transformation. The

concept of digital transformation of military education in Ukraine is currently in its infancy. AI-driven simulations are used mainly in pilot projects involving international partners and leading IT companies, mainly to practice tactics in simulated combat conditions (Bondar, 2024). These simulators can adjust scenarios according to individual user performance, as well as generate recommendations for further optimisation of training. At the same time, PSS by Logics7 VR simulators is operating in Kyiv, simulating small arms and air defence, enabling cadets to practice tactical techniques in variable weather and tactical scenarios without risking their lives (Epstein, 2025). At the same time, the lack of stable state funding and the absence of a unified strategic roadmap leads to the sporadic implementation of adaptive digital platforms and fragmented use of automated assessment systems, which significantly limits the scaling of innovations and the unification of the educational process in general.

The results of the study demonstrated a correlation between the level of funding for innovations in the field of military education and the extent of integration of artificial intelligence technologies into educational processes. To confirm this dependence, the Wald criterion was used to identify statistically significant relationships between key quantitative parameters, between the amount of state and external funding, on the one hand, and the level of implementation of innovations such as simulation environments, adaptive platforms and automated assessment systems, on the other. The calculations showed that the value of the Wald statistic for the relevant parameter exceeds the critical threshold at the significance level of 0.05, which confirms the existence of a stable positive relationship between financial support and the scale of AI integration. Countries with a higher level of stable funding (e.g., the United States and the United Kingdom) demonstrate significantly higher rates of implementation of AI tools in the training of military specialists. The application of the Wald criterion has shown that these differences are not random but statistically justified: the coefficients of the relationship between funding and the level of digitalisation in the educational sector exceed the critical values at the accepted level of significance, indicating a direct relationship. These results have important practical implications: they confirm that financial support is a determining factor in the successful integration of artificial intelligence into the educational environment of military academies. In countries with lower levels of funding, such as Ukraine, the pace of digitalisation is much slower, and the introduction of innovations is mostly fragmented and depends on international technical assistance or pilot projects.

The results of this study demonstrate that the integration of AI into higher military education has become a powerful factor in improving the effectiveness of professional training, which is consistent with several studies. At the same time, similarly to other researchers, the need to combine innovation with control, ethical standards, and ensuring a balance between automation and the human factor was

emphasised. The study also determined a positive trend in the level of teamwork among cadets who underwent AI training, particularly in a virtual collaborative decision-making environment. This result is in line with the findings of the U.S. Department of the Treasury's Office of Foreign Assets Control (2023), which showed that AI platforms can serve as a tool to enhance multilateral military cooperation, including within NATO training programmes. In addition, the study results confirm that AI significantly reduces the time required to achieve professional competence through intensive analysis of learning progress and prompt adjustment of the educational trajectory. Similar conclusions were presented by A.B. Rashid *et al.* (2023), emphasised that AI systems in the army can accelerate the process of acquiring combat and analytical skills. This partially correlates with the study by N.K. Shruthi & A.K.S. Yadav (2025), described the effectiveness of AI-based geo-intelligent systems in predicting attacks and creating simulations for training commanders. This study confirms the importance of combining technological innovations with traditional values of military education such as discipline, moral responsibility, and physical fitness. This correlates with the findings of L.V. Scipanov *et al.* (2023), emphasised the need for a harmonious combination of digital learning tools with classical teaching methods in military science.

The results of the study demonstrated that the introduction of artificial intelligence technologies can increase the efficiency of educational processes in higher military educational institutions, contributing to the adaptability of learning and improving the quality of training of military specialists. This correlates with the findings of O. Bazyl *et al.* (2025), who also noted the positive impact of AI integration on the educational systems of higher education institutions in Ukraine and Kazakhstan, especially in the context of digital transformation and innovation. At the same time, the study correlates with the article by L. Berger *et al.* (2025), emphasised the role of European countries in shaping advanced approaches to education using intelligent technologies, emphasising the importance of comprehensive education that considers the specifics of military training. Furthermore, the results coincide with the warnings of H. Oguz (2025), emphasised the potential risks of authoritarian control using AI in educational and military contexts. This emphasises the need for a balanced approach to the introduction of technologies, incorporating ethical and socio-political aspects.

Summarising the above, it is possible to conclude that the introduction of AI in military education is not only a technological innovation but also a factor of profound pedagogical transformation. In this context, the priority task is to create balanced integration models that combine pedagogical appropriateness, technological efficiency and ethical responsibility. Successful digitalisation is only possible if there is a strategic vision, regulatory support, adequate training of teaching staff and an institutional infrastructure capable of adapting innovations to the specifics of the military education system.

Recommendations for improving the process of introducing artificial intelligence into higher military education in Ukraine based on international experience

In the context of integrating artificial intelligence into higher military education in Ukraine, it is advisable to incorporate the best practices of leading NATO countries, particularly the United States, the United Kingdom and Germany, adapting their successful practices to national realities. First, it is advisable to develop a national strategy for the digital transformation of military education, which should include clear priorities, stages of implementation, funding mechanisms, and regulatory support for the process. A similar strategic approach was demonstrated by the United States, where digitalisation and the introduction of intelligent technologies in the military are supported by federal programmes.

An important step should be the creation of interdisciplinary centres for the training of military specialists in the field of AI based on leading national academies and institutes. These centres should unite experts in the fields of information technology, defence, education, and law, which will enable holistic training of officers following modern challenges. A similar experience is being implemented in the UK, where AI is integrated into curricula through the defence learning environment, and interdisciplinarity is recognised as a key condition for effective educational change. Ukrainian military educational institutions need to update the content of educational programmes by integrating adaptive learning based on the principles of personalised educational trajectories that incorporate the individual needs of cadets. In this context, it is worth focusing on American programmes that actively implement AI tools to adapt learning in real-time. In addition, an effective step would be to expand the use of digital simulations and virtual reality in military training. An example is Germany, where VR/AR technologies can simulate complex combat scenarios with high fidelity and reduce risks during training. At the same time, it is necessary to create regulatory mechanisms that govern the ethical, safe and lawful use of AI in military education. In this context, the British document JSP 936 (Ministry of Defence, 2024), which sets minimum requirements for personnel training in the ethical use of AI, is notable.

To ensure the sustainability of digital transformations, it is necessary to implement systematic programmes for the professional development of teaching staff, through the introduction of certified courses in algorithmic thinking, data analysis, digital pedagogy and the basics of AI ethics. In addition, a system for monitoring and evaluating the effectiveness of digital innovations should be created, which will enable timely adjustments to educational approaches and identify weaknesses in training. Lastly, active international cooperation, participation in joint research, exchange of experience with NATO and EU partners, as well as the inclusion of Ukrainian specialists in international initiatives in the field of military education and AI are key factors for development. Therefore, the strategic introduction of AI in higher military education in Ukraine should combine

a systematic, interdisciplinary and value-based approach that will ensure that the educational system meets the current challenges of security and technological development.

CONCLUSIONS

The results of the study confirm the relevance of integrating AI into the system of higher military education as a strategic direction for modernising military training in the context of global digital transformation. A comparative analysis of the experience of Ukraine, the United States, the United Kingdom, and Germany has shown the existence of common trends, as well as distinct national approaches to the introduction of intelligent technologies in military education. Firstly, all the countries studied recognise the critical role of digital and AI solutions in the formation of a new generation of military professionals capable of acting effectively in hybrid warfare, information influence, cyber threats and high-tech confrontation. At the same time, the level and forms of AI integration vary significantly depending on the national context, financial resources, educational policy, and strategic priorities of the defence sector. The United States has demonstrated the highest degree of technological maturity in the implementation of AI in higher military education. Emphasis is placed on the intellectualisation of educational processes through the use of adaptive learning systems, cognitive modelling, automated assessment and cloud analytics. Significant investments in research and development, as well as strong institutional support from the Defence Advanced Research Projects Agency and other agencies, ensure the leadership in innovation of the United States.

The UK relies on the development of strategic thinking of military personnel and the formation of digital literacy of future commanders. The integration of AI into the educational process is aimed at improving decision-making under uncertainty, increasing interoperability within NATO, and modelling modern combat scenarios. Germany is committed to science-based, institutionally balanced integration of AI. Visualisation platforms, training simulators, and real-world combat simulation systems play an important role. The focus is on increasing the interdisciplinary nature of training and ethical support for the use of AI in the military. Despite the existing barriers (resource constraints, incomplete legal framework, digital infrastructure problems), Ukraine demonstrates a high level of motivation to implement AI. In the context of war, the Armed Forces and educational institutions are adapting to new challenges through accelerated digitalisation, including the use of combat simulations, automated information processing systems, cyber defence elements, and distance learning.

The analysis confirmed the asymmetry of approaches to the digitalisation of military education. The United States and the United Kingdom demonstrate advanced AI integration through high levels of funding and strategic planning, while Germany is focused on slow but high-quality technology adaptation. Ukraine is in the process of active development in this area, and its further progress

depends on the implementation of a systemic state policy, deepening international cooperation, and investment in digital infrastructure. The study's findings provided several practical recommendations for Ukraine: creating a national strategy for the digitalisation of military education using AI; forming partnerships with leading NATO countries to share experience and technologies; investing in institutional modernisation, training simulators, and faculty training. Only a holistic and adaptive approach will ensure a qualitative transformation of the national military education system following the challenges of the modern security environment. The prospects are to deepen empirical

research, expand the number of countries for comparison, and analyse the effectiveness of AI solutions in the training of military specialists.

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REFERENCES

- [1] All-Party Parliamentary Groups. (2023). *Defence select committee: AI in defence report published*. Retrieved from https://www.defencetechappg.org.uk/defence_select_committee_ai_report.
- [2] Alnaqbi, A.M.A., & Yassin, A.M. (2021). Current status, challenges and strategies of artificial intelligence and e-learning the UAE military education system. *International Journal of Sustainable Construction Engineering Technology*, 12(3), 352-361. doi: 10.30880/ijscet.2021.12.03.034.
- [3] Bazyl, O., Abilova, O., Karpenko, O., Mierienkov, H., & Poliakova, A. (2025). Assessing the impact of artificial intelligence integration on educational processes in higher education institutions of Ukraine and Kazakhstan. *Sustainable Engineering and Innovation*, 7(1), 97-116. doi: 10.37868/sei.v7i1.id418.
- [4] Bekpulatov, K. (2024). Possibilities of using artificial intelligence in training military personnel in developed foreign countries. *International Multidisciplinary Research in Academic Science*, 7(12), 126-129. doi: 10.5281/zenodo.14533182.
- [5] Berger, L., Borghoff, U.M., Conrad, G., & Pickl, S. (2025). Intelligence education made in Europe: Critical reflections on the German experience. *International Journal of Intelligence and CounterIntelligence*, 38(3), 802-821. doi: 10.1080/08850607.2025.2460940.
- [6] Biggs, A.T. (2025). *Enhancing professional military education with AI: Best practices for effective implementation*. *Journal of Military Learning*, 22-37.
- [7] Black, J., et al. (2024). *Strategic competition in the age of AI: Emerging risks and opportunities from military use of artificial intelligence*. Santa Monica: RAND Corporation. doi: 10.7249/RR3295-1.
- [8] Bondar, K. (2024). *Understanding the military AI ecosystem of Ukraine*. Retrieved from <https://surli.cc/rppngm>.
- [9] Borchert, H., Schütz, T., & Verbovszky, J. (2024). Master and servant: Defense AI in Germany. In *The very long game: 25 Case studies on the global state of defense AI* (pp. 195-216). Cham: Springer. doi: 10.1007/978-3-031-58649-1_9.
- [10] Chmyr, V., & Bhinder, N. (2023). AI in the higher military institutions: Challenges and perspectives for military engineering training. *Rupkatha Journal on Interdisciplinary Studies in Humanities*, 15, article number 4. doi: 10.21659/rupkatha.v15n4.11.
- [11] Christie, E.H. (2022). Defence cooperation in artificial intelligence: Bridging the transatlantic gap for a stronger Europe. *European View*, 21(1), 13-21. doi: 10.1177/17816858221089372.
- [12] CPM Defence Network. (2024). *Virtual reality and augmented reality – importance for education and training*. Retrieved from <https://defence-network.com/virtuelle-realitaet-und-augmented-reality/>.
- [13] Defense Advanced Research Projects Agency. (2025). *AI-powered education tools chosen for further development*. Retrieved from <https://www.darpa.mil/news/2023/ai-education-tools>.
- [14] Defense Advanced Research Projects Agency. (n.d.). *Engage*. Retrieved from <https://www.darpa.mil/research/programs/engage>.
- [15] Díaz, J.E.M. (2024). Benefits and challenges of military artificial intelligence in the field of defense. *Computing and Systems*, 28(2), 309-323. doi: 10.13053/cys-28-2-4684.
- [16] Ding, S., Pavliuk, O., Lysenko, T., & Hetmanenko, L. (2025). Technology implementation in the process of higher education: Issues and opportunities. *Journal of Posthumanism*, 5(2), 1325-1344. doi: 10.63332/joph.v5i2.508.
- [17] Epstein, J. (2025). *Inside the virtual battles Ukrainian soldiers are fighting with top-of-the-line fake guns to train for real combat*. Retrieved from <https://www.businessinsider.nl/inside-the-virtual-battles-ukrainian-soldiers-are-fighting-with-top-of-the-line-fake-guns-to-train-for-real-combat/>.
- [18] Freeman, J., & Zachary, W. (2018). Intelligent tutoring for team training: Lessons learned from US military research. In *Building Intelligent Tutoring Systems for Teams* (pp. 215-245). Leeds: Emerald Publishing Limited. doi: 10.1108/s1534-085620180000019013.
- [19] Gilland, S.W., & Reeves, S.R. (2024). *West Point 2050: How the U.S. Military Academy is preparing for future conflict*. Retrieved from <https://surli.li/zukwhx>.

- [20] Hagos, D.H., & Rawat, D.B. (2024). Neuro-symbolic AI for military applications. *IEEE Transactions on Artificial Intelligence*, 5(12), 6012-6026. doi: 10.1109/tai.2024.3444746.
- [21] HGXR. (2024). *German army and HGXR bring AI to XR training*. Retrieved from <https://hgxr.com/german-army-and-hgxr-bring-ai-to-xr-training/>.
- [22] International Committee of the Red Cross. (2024). *Expert consultation report – artificial intelligence and related technologies in military decision-making on the use of force in armed conflicts: Current developments and potential implications*. Retrieved from <https://www.icrc.org/en/publication/expert-consultation-report-artificial-intelligence-and-related-technologies-military>.
- [23] Kelly, P., & Smith, H. (2024). *How to think about integrating generative AI in professional military education*. Retrieved from <https://www.armyupress.army.mil/Journals/Military-Review/Online-Exclusive/2024-OLE/Integrating-Generative-AI/>.
- [24] Kim, Y. (2021). Development and application of artificial intelligence for military training modeling and simulation in Republic of Korea. *Journal of Advances in Military Studies*, 4(2), 21-36. doi: 10.37944/jams.v4i2.114.
- [25] Ministry of Defence of Ukraine. (2024). *The Ministry of Defense announces a competition for the development of simulators based on virtual and augmented reality technologies*. Retrieved from <https://mod.gov.ua/news/ministerstvo-oboroni-ogoloshue-konkurs-na-rozrobku-simulyatoriv-na-osnovi-tehnologij-virtualnoi-ta-dopovnenoi-realnosti>.
- [26] Ministry of Defence. (2024). JSP 936: *Dependable artificial intelligence (AI) in defence (part 1: Directive)*. Retrieved from <https://www.gov.uk/government/publications/jsp-936-dependable-artificial-intelligence-ai-in-defence-part-1-directive>.
- [27] North Atlantic Treaty Organization. (2025). *Defence education enhancement programme (DEEP)*. Retrieved from https://www.nato.int/cps/en/natohq/topics_139182.htm.
- [28] Oguz, H. (2025). Authoritarian recursions: How fiction, history, and AI reinforce control in education, warfare, and discourse. *arXiv*. doi: 10.48550/arXiv.2504.09030.
- [29] Onderco, M. (2025). Navigating the AI frontier: Insights from the Ukraine conflict for NATO's governance role in military AI. *Journal of Strategic Studies*, 48(3), 602-626. doi: 10.1080/01402390.2025.2463451.
- [30] Pangarkar, T. (2025). *Artificial Intelligence in military statistics 2025: By efficiency, tech, simulations*. Retrieved from <https://scoop.market.us/artificial-intelligence-in-military-statistics/>.
- [31] Peacock, J.G., Cole, R., Duncan, J., Jensen, B., Snively, B., & Samuel, A. (2025). Transforming military healthcare education and training: AI integration for future readiness. *Military Medicine*, article number usaf169. doi: 10.1093/milmed/usaf169.
- [32] Pfaff, C.A., Lowrance, C.J., Washburn, B.M., & Carey, B.A. (2023). *Trusting AI: Integrating Artificial Intelligence into the Army's professional expert knowledge*. Carlisle Barracks: US Army War College Press.
- [33] Putra, H., & Mulyono, B.E. (2024). The role of artificial intelligence in military education: A double-edged sword. *Indonesian Journal of Educational Science and Technology*, 3(3), 167-174. doi: 10.55927/nurture.v3i3.12366.
- [34] Rashid, A.B., & Kausik, M.A.K. (2024). AI revolutionizing industries worldwide: A comprehensive overview of its diverse applications. *Hybrid Advances*, 7, article number 100277. doi: 10.1016/j.hybadv.2024.100277.
- [35] Rashid, A.B., Kausik, A.K., Sunny, A.A.H., & Bappy, M.H. (2023). Artificial intelligence in the military: An overview of the capabilities, applications, and challenges. *International Journal of Intelligent Systems*, 2023(1), article number 8676366. doi: 10.1155/2023/8676366.
- [36] Savelka, J., Kultur, C., Agarwal, A., Bogart, C., Burte, H., Zhang, A., & Sakr, M. (2025). AI technicians: Developing rapid occupational training methods for a competitive AI workforce. In *SIGCSETS 2025: Proceedings of the 56th ACM technical symposium on computer science education V. 1* (pp. 1029-1035). New York: Association for Computing Machinery. doi: 10.1145/3641554.3701935.
- [37] Scipanov, L.V., Roman, D., Pătrașcu, P., & Scipanov, D.M. (2023). *Possible solutions for capitalizing e-education tools in military science*. In *Proceedings of the IADIS international conference on e-learning 2023* (pp. 67-74). Lisbon: International Association for Development of the Information Society.
- [38] Shruthi, N.K., & Yadav, A.K.S. (2025). AI-based geo intelligent system for attack prediction and virtual simulation. In *2025 International conference on intelligent control, computing and communications (IC3)* (pp. 876-880). Mathura: Institute of Electrical and Electronics Engineers. doi: 10.1109/IC363308.2025.10956665.
- [39] Spirnak, J.R., & Antani, S. (2023). The need for artificial intelligence curriculum in military medical education. *Military Medicine*, 189(5-6), 954-958. doi: 10.1093/milmed/usad412.
- [40] Trofymenko, O., Loginova, N., Sokolov, A., Chygunov, P., & Akhmametiyeva, H. (2024). Artificial intelligence in the military. *Electronic Professional Scientific Journal "Cybersecurity: Education, Science, Technique"*, 1(25), 161-176. doi: 10.28925/2663-4023.2024.25.161176.
- [41] U.S. Department of the Treasury's Office of Foreign Assets Control. (2023). The Treasury Department implements Security Council Resolution establishing a humanitarian carveout for UN sanctions. *American Journal of International Law*, 117(2), 335-340. doi: 10.1017/ajil.2023.12.

- [42] Zughoul, O., Momani, F., Alfalah, B.M., & AlSabhany, A. (2025). Integrating artificial intelligence into military pedagogy management: A review of its impact on training in military academies. *Tanmiyat Al-rafidayn*, 44(145), 351-370. doi: 10.33899/tanra.2025.186524.

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Інтеграція штучного інтелекту у вищу військову освіту як фактор підвищення ефективності професійної підготовки

Анотація. Метою дослідження було виявити ефективні моделі та підходи до інтеграції технологій штучного інтелекту у систему вищої військової освіти. Методологія дослідження ґрунтувалася на теоретичному аналізі наукових джерел, контент-аналізі офіційних документів, статистичних звітів і використанні порівняльного аналізу національних освітніх систем у сфері підготовки військових фахівців. Було встановлено, що використання систем штучного інтелекту, зокрема адаптивного навчального програмного забезпечення, платформ з елементами віртуальної та доповненої реальності, а також нейро-символічних моделей штучного інтелекту, може давати змогу підвищити реалістичність навчальних симуляцій, посилити аналітичну підготовку слухачів та покращити динаміку засвоєння матеріалу. Особливу увагу було приділено аналізу сучасних технологічних трендів, згідно з якими ринок військового штучного інтелекту демонстрував сталий приріст, що супроводжувався зростанням потреби у фахівцях, здатних ефективно взаємодіяти з інтелектуальними системами в оперативних умовах. Виявлено, що США та Великобританія демонстрували найвищий рівень технологічної зрілості та масштабного впровадження штучного інтелекту в освітній процес, тоді як Німеччина дотримувалася поміркованого, проте структурованого підходу. Україна, попри наявні виклики, виявляла прагнення до інновацій через впровадження симуляційних рішень та адаптивних технологій, за умови подальшої державної підтримки та міжнародного партнерства. У висновках було підкреслено, що інтеграція штучного інтелекту у вищу військову освіту є стратегічно важливою для всіх чотирьох країн, хоча реалізується через різні пріоритети та інструменти. Практичне значення дослідження полягає у розробці рекомендацій щодо цифрового оновлення військової освіти в Україні з урахуванням успішного міжнародного досвіду.

Ключові слова: підготовка офіцерського складу; міжнародний досвід; професійна військова освіта; доповнена реальність; можливості штучного інтелекту з оцінки знань; персоналізоване навчання

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Influence of achievement motivation in women on satisfaction with professional and personal life

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Abstract. The relevance of the subject under study was conditioned by current trends in society, where active discussion on gender equality continues. Modern trends contribute to women's self-fulfilment and the disclosure of their personal potential. The purpose of the present study was to analyse the specific features of the influence of achievement motivation in women on their satisfaction with professional activity and personal life. For this, the following methods were employed: T. Ehlers' method of diagnosing motivation for success, K. Riff's psychological well-being scales, and E. Diener's life satisfaction scale. A comparative analysis was performed among the data obtained from working and unemployed women; married or in relationships, and women without relationships; women with children, and those without. An interpretation of the results obtained was proposed. The study showed that employed women, as well as women with children and those in relationships or married, are more likely to have high levels of psychological well-being and life satisfaction. Greater levels of life satisfaction were observed among married women and those with children. The study found that the level of motivation and satisfaction was to some extent interrelated: the greater the motivation, the better the indicators of psychological well-being and life satisfaction. Women with strong levels of motivation tend to achieve more success in various areas of life: in their professional careers, in building relationships, in starting a family, and having children. The practical value of the present study lies in the creation of methodological recommendations aimed at developing achievement motivation in women. They will help promote self-fulfilment in various areas of activity and achieve harmony between professional and personal life

Keywords: family life; career; self-fulfilment; professional development; psychological well-being

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INTRODUCTION

The relevance of the study was determined by modern changes in various spheres of life and society's striving for gender equality, which contributes to the active involvement of women in social processes. Such trends open new opportunities for self-fulfilment and the development of personal potential. Modern women increasingly often pursue career paths and self-expression, while combining this with family life, as fulfilment in various spheres contributes to overall well-being. Their desire to achieve success, develop professional skills, build relationships, and start a family

are crucial factors in personal growth. The level of motivation plays a key role in achieving life and professional goals, influencing their self-fulfilment in their career, society, and family. Successful self-fulfilment in various spheres of life can contribute to a greater level of psychological well-being and life satisfaction.

In the study by Yu.V. Lukasheva & Yu.M. Chemodurova (2024), the factors that influence life satisfaction in early adulthood women were examined. Among the key factors that determine the level of satisfaction or dissatisfaction,



the researchers highlighted internalised gender norms and gender role socialisation, which shape traditional behaviour patterns and feminist values in women. Coping strategies for overcoming stress are vital, serving as a mechanism of compensation and contributing to overall life satisfaction. Social and professional activity plays a major role, influencing psychological comfort and the risk of role conflicts. The study revealed that women who recognise the significance of their activities and have developed communication skills are generally more satisfied with their lives. In contrast, those with lower levels of satisfaction tend to focus more on social approval and experience challenges in relationships.

I. Zhilkina & S.M. Kondratyuk (2020) showed that among young adult women, all of whom are married and employed, the key components of psychological well-being include "personal growth", "positive relationships with others", and Self-Acceptance. Less pronounced were aspects such as "life goals", "autonomy", and "environmental control". Overall, this group was characterised by a moderate level of psychological well-being, formed through the pursuit of self-development, the maintenance of social ties, and the presence of life goals that meet their needs.

An empirical study by J. Melashchenko & L. Hrydkovets (2021) on the psychological well-being of modern women who chose between family and career revealed that they faced an internal conflict regarding this choice or its combination. The greatest level of psychological well-being was demonstrated by women who successfully combine career and family, while the lowest levels were observed among those who were forced to give up career advancement due to external pressure. At the same time, imposing career development can also have negative consequences, including lower self-esteem and feelings of guilt for "giving up motherhood", which makes it harder to manage one's personal life. The findings revealed that a woman's level of life satisfaction and psychological well-being depended on her ability to fulfil herself both professionally and in her family life. Combining these two aspects gives life deeper meaning, making it more fulfilling and harmonious.

Marriage and family relationships can substantially influence a woman's professional development (Zhivak, 2023). Support and understanding from a partner and family create a favourable environment for career growth, motivating women to reach new heights. Equal distribution of responsibilities in the family allows women to focus on their professional goals, while a well-organised balance between work and personal life contributes to efficiency and career satisfaction. At the same time, conflicts, stress, and misunderstandings in relationships can negatively affect psychological well-being and concentration, hindering professional fulfilment. Social and cultural expectations regarding women's roles in the family can also limit career development opportunities. The impact of family relationships on professional growth is individual and depends on unique circumstances, the level of support from the environment, motivation, and personal goals of women. M. Zhivak (2023) confirmed a

correlation between family relationships and professional self-fulfilment: a supportive family environment can be an essential factor in career development.

According to the findings of I. Ustymenko & A. Harchenko (2022), unemployed and employed women have distinct indicators of psychological well-being. Unemployed women are characterised by lower levels of psychological well-being, autonomy, Environmental Mastery, personal growth, self-perception, and purpose in life. Lack of fulfilment in the professional sphere leads to feelings of psychological distress and difficulties in self-perception, which contradicts current trends, where women strive for self-fulfilment, financial independence, and self-sufficiency. According to existing social trends and gender stereotypes, women who lost their jobs and income experience lower levels of well-being. In contrast, employed women demonstrate greater levels of well-being, which is expressed in their ability to actively interact in society, their positive self-perception, and the fulfilment of their potential. It was found that employed women have greater levels of psychological well-being and quality of life, and they are also more motivated to achieve success.

In the paper by L.P. Mishykha & V.Yu. Kravchenko (2022), the factors influencing the psychological well-being of middle-aged women were identified. These included physical and mental health, family well-being, feelings of attractiveness and youthfulness, financial stability, and confidence in the future. Barriers to psychological well-being for women of this age include poor health, loneliness, disharmonious family relationships, unemployment, lack of children, lack of prospects for the future, inability to fulfil their personal needs, as well as lack of hobbies, interests, friends, and productive leisure activities.

Research conducted by V.I. Afanasenko & T.V. Komar (2021) showed that the marital status of women of different ages is related to their psychological well-being. Married women demonstrated greater levels of psychological well-being compared to those who were never married. Divorced women occupied an intermediate position in terms of psychological well-being between married women and those who were never married. K.P. Havrylovskaya & I.M. Pavliuk (2021) found that the greatest level of psychological well-being was observed in older women who raised children and were either married or in a relationship. The lowest level of psychological well-being was found among single women who did not have children. Single women who were raising children without a partner had greater levels of psychological well-being than single women or married women without children.

The purpose of this study was to investigate empirically the influence of the level of motivation in women of different marital and professional status on the level of psychological well-being and satisfaction in various areas of life. The scientific originality of the study lies in supplementing theoretical knowledge about the influence of achievement motivation on psychological well-being and satisfaction with professional and personal life in women.

MATERIALS AND METHODS

The research base included an online survey of Ukrainian women of different social, professional, and family status. The number of respondents was 52, with the age range of the sample being 18-65 years. The study was conducted in November 2024. An anonymous questionnaire was developed using Google Forms. Respondents answered at a convenient time, and responses were received electronically.

The largest category of women in the sample was in the 26-45 age group (48 respondents, 92.3%), followed by the 18-25 age group with 1 respondent (1.9%), and the 46-65 age group with 3 respondents (5.8%). Among the respondents, 29 (55.8%) were married, 10 (19.2%) were in a relationship, and 13 (25%) were not in a relationship. According to the survey results, 42 (80.8%) respondents were employed, 10 (19.2%) were unemployed. Among the women surveyed, 64.7% did not have children (33 respondents), 35.3% (18 respondents) had children. To achieve the empirical goals of the study, the following psychodiagnostic methods were employed:

T. Ehlers' method for diagnosing personal motivation for success, adapted in Ukrainian (Kokun *et al.*, 2012). This questionnaire with 41 questions (answers in "yes" or "no" format) allows assessing the level of motivation for success, classifying it as low, medium, high, or very high. According to the interpretation of the data obtained using the method for assessing personal motivation for success, the level of motivation for success is assessed using the following indicators:

- 1-10 points – low level of motivation;
- 11-16 points – average level;
- 17-20 points – moderately high level of motivation;
- over 21 points – very high level of motivation to achieve success.

Psychological Well-Being Scales by K. Riff, adapted by S.V. Karskanova (2011). The methodology measures the severity of key aspects of psychological well-being based on an eudaemonistic approach. It is based on six key components: purpose in life, positive relations with others, personal growth, Environmental Mastery, Self-Acceptance, and autonomy. The components are scored to determine the overall level of psychological well-being: low (<315 points), medium (315-413 points), high (414-504).

The "Positive relations with others" scale assesses the ability to form trusting and warm relationships. The criteria examined include the level of social support, openness in communication, tendency to empathise and compromise. Respondents with high scores have harmonious relationships, care about others, and are willing to compromise, while those with low scores feel isolated, find it challenging to open up, and often avoid meaningful relationships. The "Autonomy" scale measures independence. Criteria studied include the level of independence in decision-making, confidence in one's beliefs, and ability to resist social pressure. A high score indicates independence and the ability to act according to personal beliefs, while a low score indicates dependence on the opinions of others and a tendency to succumb to external pressure.

The Environmental Mastery scale determines the ability to control the environment. The criteria studied include effectiveness in achieving set goals, ability to adapt to change, and organisational skills. A high score indicates competence in managing situations and achieving goals, while a low score indicates difficulties in organising activities and a feeling of lack of control. The Personal Growth scale assesses the ability to develop. The criteria examined include desire for self-improvement, willingness to learn and master new things, and openness to change. Respondents with high scores feel a constant need for improvement and fulfilment of their potential, while those with low scores have no interest in change and development.

The Purpose in life scale determines the presence of a life direction. The criteria studied include clarity and awareness of life goals, level of motivation, and sense of meaning in life. A high score indicates the presence of clear goals and beliefs that give meaning to life, while a low score indicates a lack of purpose and direction. The Self-Acceptance scale measures attitudes towards oneself. The criteria examined include the level of self-esteem, satisfaction with oneself, attitude towards one's personal achievements, and shortcomings. A high score indicates Self-Acceptance, including one's shortcomings, while a low score indicates dissatisfaction with oneself and a desire to be different.

E. Diener's "Life Satisfaction Scale" in the Ukrainian adaptation by V. Olefir & V. Bosnyuk (2024) is one of the most widely used tools for assessing overall life satisfaction. The Life Satisfaction Scale (SWLS) is used to assess a person's overall cognitive perception of their life. Subjective well-being includes two key aspects: emotional (affective) and cognitive (related to evaluation and judgement). The SWLS was developed specifically to measure the cognitive component. The results are assessed by a total score, which can range from 5 to 35. The higher the total score, the greater the level of life satisfaction. Interpretation of results on the life satisfaction scale (range: 5-35 points):

- 31-35 points: extremely satisfied;
- 26-30 points: satisfied;
- 21-25 points: slightly satisfied;
- 20 points: neutral;
- 15-19 points: slightly dissatisfied;
- 10-14 points: dissatisfied;
- 5-9 points: extremely dissatisfied.

The following ethical standards were observed in the study. Respondents made a voluntary decision to take part in the survey. They had the opportunity to familiarise themselves with the purpose of the study before providing their answers. The use of Google Forms without requiring an email address prevented the collection of personal data. The collected data was processed and stored in a way that made the identification of participants impossible. Respondents could answer at a time convenient for them, which shows that their comfort was factored in. The study was conducted using approved and tested methods and did not contain questions that could cause psychological or emotional harm to participants (Declaration of Helsinki, 2013).

RESULTS

The findings of the study, using all methods, were considered separately according to marital status, professional status, and the presence of children. According to the data obtained using the method of assessing personal motivation to achieve success, the following results were found: in the group of women who were in a relationship or married, regardless of whether they had a professional activity and children, the average (41%) and moderately high levels of motivation (28.2%) prevailed, with the same percentage of low (15.4%) and very high levels of motivation (15.4%). Among women without relationships, the average (46.2%) and moderately high levels of motivation (30.8%) prevailed, with a very high level found in 15.4%. A low level of motivation (7.7%) was less frequent than among women in relationships and married women (Fig. 1).

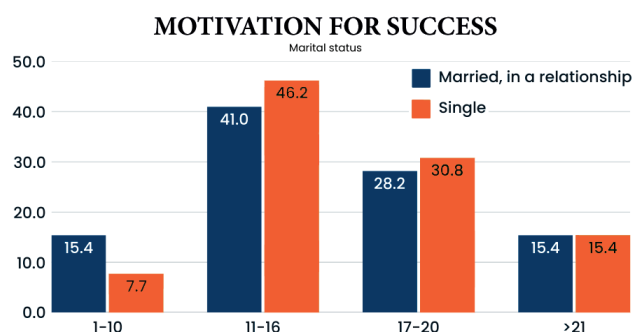


Figure 1. Motivation for success – marital status

Source: developed by the author of this study based on personal findings

The general trend showed that regardless of marital status, professional status, and the presence of children, the most widespread levels of motivation among women were moderate and moderately high. This may suggest a fairly high level of internal motivation among modern women who strive to achieve success regardless of external factors. Notably, women who were in a relationship or married demonstrated slightly lower levels of motivation to succeed compared to those who were not in a relationship, and they also more often had low levels of motivation, which can be explained by a greater level of stability and a lower need for additional self-fulfilment, or by external factors such as gender stereotypes. Women who were not in relationships were less likely to have low levels of motivation, which may be conditioned by greater freedom for self-fulfilment, free time, and financial needs. Interestingly, very high levels of motivation were observed equally among women in relationships and women without a partner (15.4%). This may suggest that the desire to achieve remarkable results is an individual personality trait that does not necessarily depend on marital status.

The results for employed and unemployed women, regardless of marital status, relationship status, or presence of children, were as follows: unemployed women were

slightly more likely to have low motivation for success (20%) than employed women (11.9%). Employed women were more likely to have a very high level of motivation to succeed (16.7%), while unemployed women had a slightly lower level (10%) (Fig. 2).

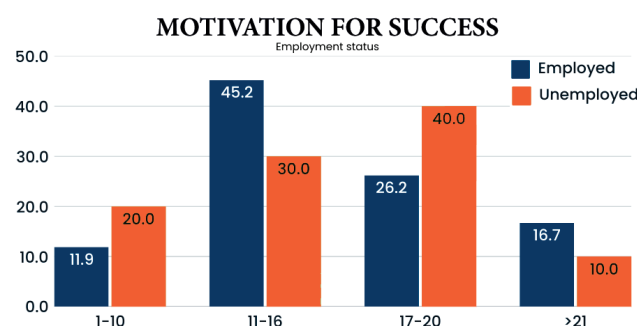


Figure 2. Motivation for success – employment status

Source: developed by the author of this study based on personal findings

An analysis of motivation levels among unemployed and employed women showed that the latter were slightly less likely to have low motivation levels, with high levels prevailing, which may suggest that professional activity was an additional factor stimulating achievement and personal development. The working environment can create more opportunities for the fulfilment of ambitions, self-improvement, and success.

The results for working and unemployed women presented in the study by I. Ustymenko & A. Harchenko (2022) were interesting to compare. It was found that employed women were characterised by a predominance of motivation to achieve success ($\chi^2 = 12.72$, $p \leq 0.01$), which manifested itself in their focus on results and efficiency in their work. At the same time, unemployed women were more likely to be motivated to avoid failure, which was expressed in their desire to avoid productive activity.

Comparing the level of motivation in women with children and those without, it was found that women with children had a predominantly average level of motivation (44.4%) and a moderately high level (27.8%). Women without children had a predominantly average (41.2%) and moderately high level of motivation (29.4%). Women with children were less likely to have low motivation (5.6%) than women without children (17.6%) and more likely to have very high motivation (22.2%) than women without children (11.8%). This is illustrated in Figure 3. The analysis of the data revealed that women with children more often had average and high levels of motivation and less often had low levels of motivation compared to women without children. This may suggest that motherhood can be one of the components of achievement motivation, stimulating women to succeed in family and marital relationships.

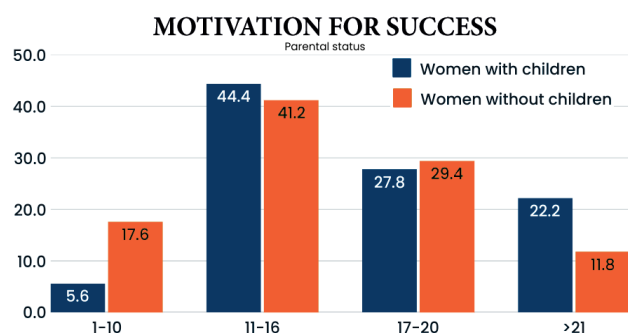


Figure 3. Motivation for success – parental status

Source: developed by the author of this study based on personal findings

According to the results of the Psychological Well-Being scale, women who were not in a relationship did not score high on the Positive Relations, Environmental Mastery, and Purpose in Life Scales, but the average score prevailed: Positive relations – 61.5%, Environmental Mastery – 69.2%, Purpose in Life – 92.3%. They also did not have low scores on the Autonomy scale, with average

(76.9%) and high (23.1%) scores prevailing (Table 1). Low scores on the Positive Relations, Environmental Mastery, and Purpose in Life Scales may suggest that women who were not in a relationship had some challenge establishing and maintaining close social ties. They may pay less attention to social integration or perceive their environment as less controllable. Low scores on the Purpose in Life scale may suggest that their life aspirations were not always clearly defined or that they felt less motivated to achieve them. Medium and high levels of Autonomy mean that these women were more focused on independence in decision-making, internal self-sufficiency, and lesser dependence on external factors. They may show greater levels of self-control and independence in their lives. Women who were in relationships or married were more likely to score low on the Autonomy (10.3%), Purpose in Life (20.5%), and Personal Growth (23.1%) scales than women who were not in relationships. However, they scored high on the Positive Relations (10.3%), Environmental Mastery (10.3%), and Purpose in Life (12.8%) scales, unlike women without relationships, who did not score high on these scales (Table 2).

Table 1. Psychological well-being scales – results in women who were not in a relationship

Level	Positive Relations	Autonomy	Environment Mastery	Personal Growth	Purpose in Life	Self-Acceptance	Psychological Well-Being
low	38.5%	–	30.8%	7.7%	7.7%	23.1%	30.8%
average	61.5%	76.9%	69.2%	84.6%	92.3%	69.2%	61.5%
high	–	23.1%	–	7.7%	–	7.7%	7.7%

Source: developed by the author of this study based on personal findings

Table 2. Psychological well-being scales – results for women who were married or in a relationship

Level	Positive Relations	Autonomy	Environment Mastery	Personal Growth	Purpose in Life	Self-Acceptance	Psychological Well-Being
low	28.2%	10.3%	23.1%	23.1%	20.5%	28.2%	25.6%
average	61.5%	69.2%	66.7%	61.5%	66.7%	56.4%	61.5%
high	10.3%	20.5%	10.3%	15.4%	12.8%	15.4%	12.8%

Source: developed by the author of this study based on personal findings

Women who were in relationships or married tended to score lower on the Autonomy, Purpose in Life, and Personal Growth scales than women who were not in relationships. This may suggest that their life priorities were more focused on partnership and family roles than on their independence and self-fulfilment. Social norms and expectations regarding female roles in the family, which influence feelings of autonomy and the desire for personal development, may play a significant part in this. At the same time, women in relationships were more likely to have positive and trusting relationships with those around them and to have better control over external circumstances. This can be explained by emotional support from a partner, which promotes stability, as well as the ability to share responsibility in decision-making and solving life situations. A sense of social approval and security can boost self-confidence.

In terms of the overall result for psychological well-being, low levels were slightly more frequent among women

who were not in a relationship; high levels of psychological well-being were more frequent among women who were in a relationship or married. The average level was the same for both groups. V.I. Afanasenko & T.V. Komar (2021) reported analogous findings. The researchers concluded that among women who were never married, the highest percentage had low psychological well-being, and the lowest percentage had high psychological well-being. The psychological well-being of women who were never married was slightly lower than that of those who were married or had been married and were divorced. Thus, the psychological well-being of women who were never married was generally lower than that of those who were married. The absence of marriage negatively influenced psychological well-being.

In terms of the results of the level of psychological well-being among women with children and women without children, a high level of psychological well-being was found in 5.9% of respondents who did not have

children, while among women who had children, it was found in 22.2%. In addition, women without children slightly predominated in terms of low psychological well-being, accounting for 29.4%, while among women with children, low psychological well-being was found in 22.2%. K.P. Havrylovskaya & I.M. Pavliuk (2021) reported comparable findings. It was noted that 79% of women with high psychological well-being were women with adult children who lived separately. The highest percentage (42%) of women with low well-being were those who did not have children. The highest level of psychological well-being was observed among older women who had already raised their children and were married or in a relationship. The lowest psychological well-being was found among single women without children. At the same time, single mothers demonstrated a greater level of psychological well-being than single or married women without children.

When comparing employed and unemployed women, the study found that the low well-being indicator was slightly higher among unemployed women, at 30%, while among working women it was 26.2%. The average and high levels of well-being were almost the same in both groups, but slightly higher among the employed women. I. Ustylenko & A. Harchenko (2022) reported analogous findings. According to their study results, unemployed women had lower levels of psychological well-being ($\chi^2 = 7.41$, $p \leq 0.05$), autonomy ($\chi^2 = 10.95$, $p \leq 0.01$), Environmental

Mastery ($\chi^2 = 10.48$, $p \leq 0.01$), personal growth ($\chi^2 = 13.24$, $p \leq 0.01$), self-perception ($\chi^2 = 12.47$, $p \leq 0.01$), and purpose in life ($\chi^2 = 10.67$, $p \leq 0.01$). On the other hand, working women demonstrated a higher level of psychological well-being, which was reflected in their active social interaction, positive self-perception, and successful fulfilment of their potential.

Thus, a high level of psychological well-being was slightly more prevalent among employed women than among unemployed women and was also more frequent among women who had children than among those who did not. A high level of psychological well-being was also more prevalent among women in relationships or married women than among women without relationships. Comparing the level of life satisfaction among women in relationships or married women and women without relationships, certain patterns could be observed. Women who were in relationships demonstrated greater levels of life satisfaction. Specifically, 10.3% of them had a very high level of satisfaction (31-35 points), and 25.6% were satisfied (26-30 points). For comparison, among women without relationships, these indicators were lower: only 7.7% were extremely satisfied, and 15.4% were satisfied. Furthermore, women in relationships were more likely to have an average level of satisfaction (21-25 points) – 28.2%, while among women without relationships, this indicator was 23.1% (Fig. 4).

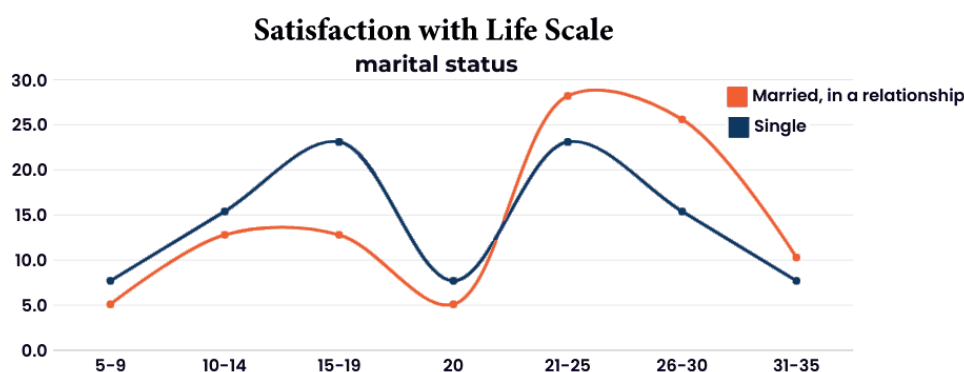


Figure 4. Satisfaction with life scale – marital status

Source: developed by the author of this study based on personal findings

In terms of dissatisfaction with life, this level was greater among women without relationships. For example, 23.1% of them felt slightly dissatisfied (15-19 points) compared to 12.8% among women in relationships. Low satisfaction levels were also more prevalent among women without relationships: 7.7% were extremely dissatisfied (5-9 points) compared to 5.1% among married women or those in relationships.

These results may suggest that being in a relationship or marriage was often associated with greater life satisfaction, possibly due to support, stability, and a sense of emotional security. At the same time, women without relationships tended to have lower levels of satisfaction, which may be related to a lack of emotional support or

other factors that affected their overall well-being. When comparing life satisfaction among employed and unemployed women, both comparable and distinct trends could be observed. High levels of life satisfaction were more frequent among employed women. Specifically, 9.5% of them fell into the “extremely satisfied” category (31-35 points), and 23.8% into the ‘satisfied’ category (26-30 points). For unemployed women, these figures were slightly lower: 10% were extremely satisfied and 20% were satisfied. Among unemployed women, there were significantly more of those with the slightly satisfied level (21-25 points) – 40%, which markedly exceeded the same indicator among employed women (23.8%). As for low levels of satisfaction, working women were more likely to be “slightly dissatisfied” (15-19

points – 14.3%) and “dissatisfied” (10-14 points – 14.3%). Additionally, in this group, 7.1% of respondents had the

lowest level of satisfaction (5-9 points), while among unemployed women, there were none (Fig. 5).

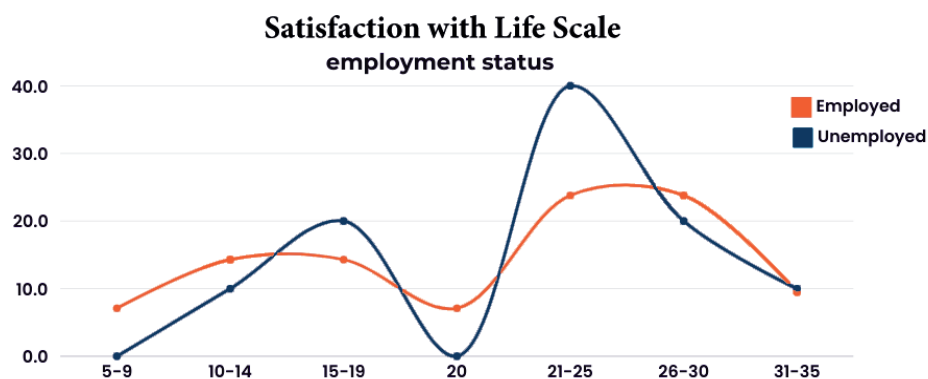


Figure 5. Satisfaction with life scale – employment status

Source: developed by the author of this study based on personal findings

Another difference was that among working women, there was a neutral level of satisfaction (7.1%), while among unemployed women, this indicator was absent. This may suggest that unemployed women tended to have either more positive assessments of life or more pronounced dissatisfaction, without an intermediate neutral state. Thus, employed women generally demonstrated a slightly greater level of life satisfaction in the ‘satisfied’ category, but the lowest levels of satisfaction were also more prevalent among them. In contrast, unemployed women had a predominantly average level of satisfaction, with no critically low ratings. This may suggest greater stability in their emotional state, while working women had a more differentiated level of life satisfaction. When comparing the level of life satisfaction between women with children and those without, considerable differences could be observed.

Women with children were more likely to have the greatest level of life satisfaction: 22.2% of them fell into the “extremely satisfied” category (31-35 points), while among women without children, this figure was only 2.9%. At the same time, in the “satisfied” category (26-30 points), the trend was the opposite – there were more women without children (29.4%) than mothers (11.1%). This may suggest that motherhood gives a stronger sense of happiness to some women, while childless women tend to have a stable but less pronounced level of life satisfaction. In the middle levels of satisfaction (21-25 points), the differences between the groups were minimal: 27.8% among mothers and 26.5% among women without children, suggesting that regardless of whether they had children, a certain proportion of women rated their lives as slightly satisfactory (Fig. 6).

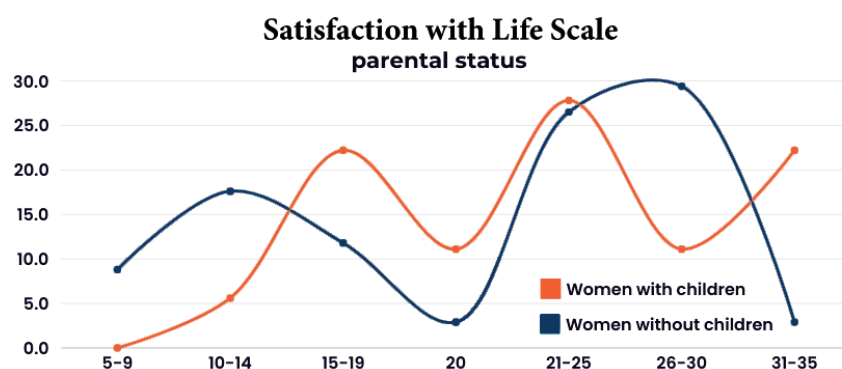


Figure 6. Satisfaction with life scale – parental status

Source: developed by the author of this study based on personal findings

Upon considering lower levels of satisfaction, women without children were more likely to give negative ratings. Specifically, 17.6% of childless women fell into the “dissatisfied” category (10-14 points), while among mothers this figure was only 5.6%. Additionally, in the group of women without children, 8.8% were “extremely dissatisfied” (5-9 points), while among mothers, this indicator was absent.

Thus, women with children demonstrated a more pronounced polarisation: among them, there were both more “extremely satisfied” and slightly dissatisfied. In contrast, women without children were more likely to report moderate life satisfaction, but at the same time, they also had the lowest levels of satisfaction. This may suggest that motherhood was a prominent factor influencing the feeling of

happiness, reducing the probability of the lowest levels of life satisfaction.

Comparing the results of testing the level of motivation for success and the overall indicator on the psychological well-being scales, the following results were established: among respondents who received the greatest psychological well-being scores (414-504), there was no low level of

motivation for success (1-10), with average (11-16) and moderately high levels of motivation (17-20) prevailing. As for respondents with the lowest psychological well-being scores (<315), average (11-16) and moderately high (17-20) levels of motivation for success also prevailed, but both low (1-10) and the highest levels of motivation (>21) could be found (Fig. 7).

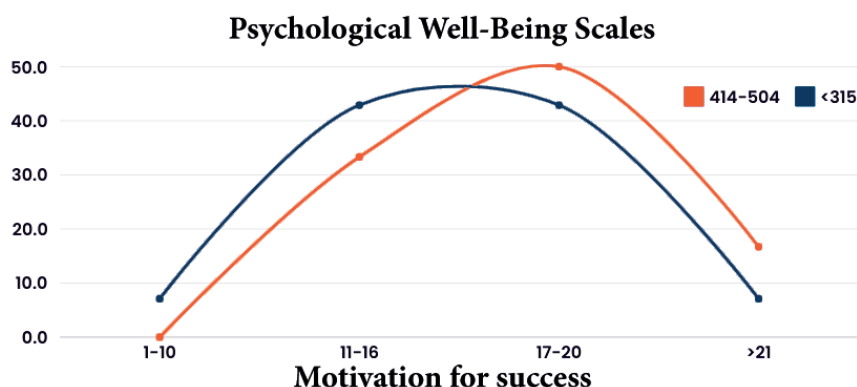


Figure 7. Psychological well-being scales vs Motivation for success

Source: developed by the author of this study based on personal findings

Among respondents with the greatest psychological well-being scores, there was no low level of motivation to succeed. This may suggest that moderate to high levels of motivation contributed to goal achievement and high psychological well-being. Such levels of motivation provided a balance between ambition and psychological comfort. The situation with respondents who had the lowest psychological well-being scores was more ambiguous. Although medium and moderately high levels of motivation to succeed also prevailed among them, both low and high levels were found. This may suggest two opposing trends: on the one hand, low motivation may be the result of emotional exhaustion, lack of self-confidence, or life difficulties that reduced psychological well-being. On the other hand, overly high motivation to succeed could be accompanied

by perfectionism, stress, and constant dissatisfaction with personal achievements, which negatively affected overall well-being.

Comparing the highest psychological well-being scores with the life satisfaction scale, it was found that high psychological well-being (414-504) was also associated with high life satisfaction scores: extremely satisfied (31-35 points) and satisfied (26-30 points), with no lower levels observed. As for the results of respondents with the lowest psychological well-being scores (<315), low levels of life satisfaction were found among them: extremely dissatisfied (5-9), dissatisfied (10-14), slightly dissatisfied (15-19), and slightly satisfied (21-25); no levels of life satisfaction were found: extremely satisfied (31-35 points) and satisfied (26-30 points) (Fig. 8).

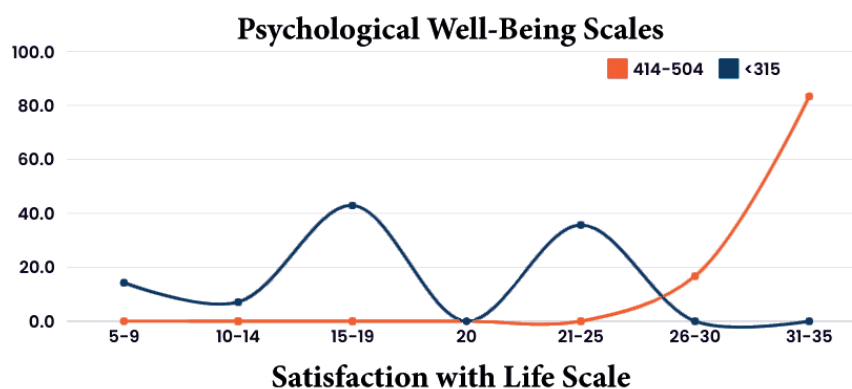


Figure 8. Psychological well-being scales vs Satisfaction with life scale

Source: developed by the author of this study based on personal findings

Analysing the relationship between psychological well-being and life satisfaction, a clear positive correlation can be observed between these indicators. Respondents with high psychological well-being scores reported correspondingly high levels of life satisfaction. They were predominantly either satisfied or extremely satisfied, with no lower levels of satisfaction observed. This suggests that psychological well-being is associated with life satisfaction. On the other hand, low levels of life satisfaction prevailed among respondents with the lowest levels of psychological well-being. They were more likely to feel dissatisfied, disappointed, or even strongly dissatisfied with their lives, ranging from “slightly satisfied” to “extremely satisfied”. Therewith, none of the respondents in this group had high levels of satisfaction. This may suggest that psychological well-being is an essential factor in the subjective perception of happiness and quality of life.

Thus, the results confirmed that psychological well-being and life satisfaction are closely interrelated. A high level of well-being contributes to a sense of satisfaction, while its decline may be accompanied by a negative perception of personal life and general emotional discomfort. According to the findings of J. Melashchenko & L. Hrydkovets (2021), the level of life satisfaction and psychological well-being of modern women depends on their ability to combine key areas of self-fulfilment, such as family and professional life. In cases where women managed to harmoniously combine these areas, their level of psychological well-being approached a high level. Achievement motivation in women contributed to the successful realisation in various spheres of life. The greater the level of motivation for success, the more self-fulfilled a woman is in her professional and personal life, and the greater her psychological well-being and level of life satisfaction.

DISCUSSION

Analogous studies, including a study of psychological well-being in future psychologists with different types of motivation (Ihumnova *et al.*, 2020), found that the greatest level of development of the key components of psychological well-being was observed in students with the second type of achievement motivation, characterised by high or extremely high motivation to succeed and low or average motivation to avoid failure. These students demonstrated high scores on almost all components of psychological well-being. A slightly lower level of subjective well-being was found among students belonging to the first (with high or very high motivation for both success and avoidance of failure) and fourth types of achievement motivation (with low or average levels of both motivation for success and motivation for avoidance of failure). However, among students with the fourth type, most indicators were at the lower end of the average level of development. The lowest level of psychological well-being was observed among students who had high or extremely high motivation to avoid failure and low or average motivation to succeed. They showed low scores on almost all components of psychological well-being.

According to L. Zagrai & S. Symovonik (2022), IT workers with high, moderate, and average levels of motivation to achieve success mostly had high levels of job satisfaction, particularly regarding its hygienic and motivational factors. This suggested that job satisfaction could serve as a predictor of motivation to achieve success in this field. The findings of this study on the impact of achievement motivation on satisfaction with professional and personal life confirmed the general trends established in the studies of well-known scientists regarding the effects of employment, family status, the presence of children, and the level of motivation on the psychological well-being of women. Specifically, it was found that employed women had greater levels of motivation and psychological well-being than unemployed women. E. Diener (2009) noted that professional activity correlated positively with overall life satisfaction, as it contributed to a sense of personal development and social significance.

In terms of the influence of family status, the study found that women who were married or in a relationship demonstrated greater levels of psychological well-being compared to women who were not in a relationship. M. Argyle (2001) showed that people who had a family, especially those who were in harmonious marital relationships, were more likely to feel satisfaction with life. Close relationships with family and friendly communication made it easier to overcome challenges, provide emotional support in difficult moments, and help strengthen self-esteem. Work can also be a source of life satisfaction, especially if it is enjoyable, allows for development, and the fulfilment of personal potential.

Furthermore, it was found that the level of motivation to succeed affects psychological well-being. This trend was consistent with D.C. McClelland's (2009) theory of achievement motivation, which proved that the desire for success was a key factor in personal growth and psychological comfort. The results of many studies on the effects of psychological well-being on physical health, cited in an article by R. Hernandez & S.M. Bassett (2018), are interesting. The researchers summarised existing evidence of the connection between psychological well-being and physical health, particularly in relation to mortality and chronic diseases. They provided evidence that factors such as optimism, positive affect, and a sense of meaning and purpose in life can reduce the risk of chronic diseases and increase life expectancy.

O.O. Kryvoshey & T.V. Selyukova (2020) highlighted the concept and influence of achievement motivation on professional growth. The researchers concluded that the level of achievement motivation plays a key role in the future, since success in any field depends not only on knowledge and abilities, but also on internal motivation. It can be defined as a person's desire to increase or maintain the highest possible level of their abilities in activities where performance can be evaluated and where the completion of a task can lead to success or failure. Achievement motivation is focused on a concrete end result that a person obtains through their personal qualities, striving for success, or trying to avoid failure. It is characterised by the ability to

constantly review and adjust goals. Achievement motivation distinguishes people by their desire for success. Individuals with a high level of this motivation strive to achieve remarkable results in their activities, while people with a low level of motivation are indifferent to success, are not interested in achieving prominent results, and do not make efforts to achieve them. Achievement motivation markedly influences a person's activity in a particular situation or field of activity. However, it is not the only factor; other factors (the complexity of the task, the value of success, the probability of success) also influence the desire to achieve success at a particular moment in time.

In her study on the characteristics of motivation in student groups, L.M. Mukhina (2024) noted that motivation to achieve success is a positive motivation: when a person undertakes a task, they try to achieve their goal, create something new, and hope for a positive result. The basis of their activity is the need to achieve high results and, accordingly, high self-esteem. Such people are usually confident in themselves and their abilities, responsible, proactive, and active. They are determined and persistent in achieving their goals. Motivation to avoid failure belongs to negative motivation: the activities of such people are driven by the desire to avoid failure, punishment, condemnation, or breakdown. Their activity is determined by negative expectations. When undertaking a task, they are mostly afraid of failure and focus more on how to avoid it than on achieving success. Such people are often unsure of their abilities and prone to anxiety, although this may be combined with a responsible attitude towards work.

In a series of Ukrainian studies, the term "personal success" is viewed as a process of personal development, self-determination, and adaptation to external conditions (Pasechnikova, 2008). This is not a random phenomenon, but the result of accumulated life experience based on positive thinking and lifestyle. It is based on motivation to achieve set goals through purposeful activity and the desire for continuous self-improvement. L.P. Pasechnikova (2008) emphasised that the development of an orientation towards life success in senior school students depends on several factors: their awareness of the significance of success as a personal value, the focus of teachers and parents on personal achievement and support for students in this area, as well as the creation of an environment in the educational institution that stimulates self-development. L.P. Pasechnikova emphasised that "orientation towards achieving success in life" is a motivated desire of an individual to achieve remarkable results that have both social recognition and personal significance.

As shown by the findings of N.I. Poviakel (1999), who studied the psychological prerequisites for the development of a psychologist's self-concept, the effectiveness of a practical psychologist's work is largely determined by the presence and level of development of professionally significant personal qualities. These include adequate and stable self-esteem, sensitivity to the emotions of others, the ability to empathise, resistance to frustration, and the absence

of chronic internal conflicts that can lead to inadequate psychological defences or projections. The development of these qualities allows the specialist to focus fully on the needs and condition of the client, not to use interaction for self-affirmation, and not to be distracted by their personal emotional experiences during counselling work.

In his study on achievement motivation as a determinant of success in professional careers, N.O. Pryadko (2015) emphasised that the subjective value and attractiveness of success in activity is an essential factor influencing the development of achievement motivation. For its development, it is necessary to teach a person certain patterns of behaviour characteristic of individuals with a high level of this motivation. Specifically, they should be taught to choose goals of medium difficulty, avoiding both too easy and too difficult tasks, to give preference to situations where success depends on personal responsibility, and to analyse real examples from their own lives and the experience of people who have strong achievement motivation. Thus, high achievement motivation is formed thanks to such personal characteristics as the level of aspirations, type of locus of control, sense of personal responsibility, as well as the dominance of the desire for success or fear of failure. Analysis of these characteristics allows assessing the level of development of achievement motivation and, accordingly, predict a person's success in various areas of their life.

A study of the psychological characteristics of self-determination in women oriented towards management activities by B.A. Shcherbatyuk (2006) showed that women oriented towards management activities often have an unstructured idea of their desires ("I want") and capabilities ("I can"). This applies to both their aspirations and goals, as well as their awareness of existing and potential resources for self-fulfilment. Low statistical indicators using the management orientation assessment method confirm this fact. This conclusion suggests that the "glass ceiling" on the path towards leadership positions is a socio-psychological phenomenon. Its impact can be reduced by working purposefully to help women who aspire to a management career to set goals. It was found that self-determination in these women initially occurs through self-awareness as individuals in interaction with others, accompanied by the development of social and communication skills. Only then is a professional identity formed, in which responsibility and the ability to innovate play a key role. In terms of social expectations, women who choose the management field report that they are required above all to be strong-willed and independent.

The results of a study of motivation among medical students (Venger *et al.*, 2018) showed that students' motivation to achieve success changed over time. Specifically, in the 4th year, there were more students with high and very high levels of this motivation compared to the 2nd year. This indicated that their academic activity was largely determined by internal motives that contributed to the effective mastery of their future profession.

Motivation to work is a strong desire of a person to perform tasks related to their goals and needs (Werdhiastutie *et*

al., 2020). This study found that people were motivated to achieve according to their personal needs. Achievement motivation is aimed at stimulating changes and improvements that will be implemented and evaluated when improving the quality of an organisation's human resources. Satisfying individual needs can improve productivity. Introducing achievement motivation into the work system, accommodating the needs and desires of employees, contributes to a marked increase in their individual productivity. Thus, the findings of the study confirmed the data of Ukrainian authors of scientific studies and global scientific approaches to investigating the relationship between motivation, self-fulfilment, employment, family status, and the level of psychological well-being and life satisfaction in women.

CONCLUSIONS

Motivation research showed that unemployed women are more likely to have low motivation, while employed women, on the contrary, are more likely to demonstrate very high motivation. Among women who were married or in a relationship, low motivation was more prevalent than among single women. At the same time, women with children were less likely to have low motivation, while very high motivation was more prevalent than among those without children. The study also found that high levels of psychological well-being were more widespread among employed women than among those unemployed, as well as among women who had children compared to those who did not. Furthermore, high levels were more common among women who were in a relationship or married compared to women without a relationship. When comparing employed and

unemployed women, low levels of well-being were slightly more prevalent among unemployed women. In terms of life satisfaction, high life satisfaction scores were more prevalent among married women or women in relationships than among women without relationships. The greatest level of life satisfaction was more prevalent among women with children. No significant differences in results or the effects of professional activity on satisfaction were found.

The study found that the greater the level of motivation for success, the greater the level of psychological well-being and life satisfaction. Since achievement motivation is the desire to achieve remarkable results in any activity, it can be assumed that women with prominent levels of motivation are more likely to achieve success in their professional lives, in building relationships and families, and in having children. Further research could consider how motivation to avoid failure affects women's self-fulfilment in different areas of life and their psychological well-being and life satisfaction. It could also be interesting to explore and compare the levels of motivation to succeed and motivation to avoid failure in married and single women, and in employed and unemployed women.

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CONFLICT OF INTEREST

The author of this study declares no conflict of interest.

REFERENCES

- [1] Afanasenko, V.I., & Komar, T.V. (2021). [Features of psychological well-being of women with different marital status](#). *Current Issues in Psychology*, 9(13), 177-189.
- [2] Argyle, M. (2001). *The psychology of happiness*. London: Routledge. doi: 10.4324/9781315812212.
- [3] Declaration of Helsinki. (2013, January). Retrieved from <https://www.wma.net/what-we-do/medical-ethics/declaration-of-helsinki/>.
- [4] Diener, E. (2009). In E. Diener (Ed.), *The science of well-being: The collected works of Ed Diener* (pp. 1-10). Berlin: Springer Science + Business Media. doi: 10.1007/978-90-481-2350-6_1.
- [5] Havrylovskaya, K.P., & Pavliuk, I.M. (2021). Psychological well-being of women with different sexuality indexes. *Scientific Bulletin of Uzhhorod National University. Series: Psychology*, 3, 45-48. doi: 10.32782/psy-visnyk/2021.3.9.
- [6] Hernandez, R., & Bassett, S.M. (2018). Psychological well-being and physical health: Associations, mechanisms, and future directions. *Emotion Review*, 10(1), 18-29. doi: 10.1177/1754073917697824.
- [7] Ihumnova, O., Dzhygun, L., & Rudenok, A. (2020). Psychological well-being of future psychologists with different types of achievement motivation. *Bulletin of the National Aviation University. Series: Pedagogy. Psychology: Collection of Scientific Papers*, 1(16), 164-172.
- [8] Karskanova, S.V. (2011). [Questionnaire "Psychological well-being scales" by C. Ryff: Process and results of adaptation](#). *Practical Psychology and Social Work*, 1, 1-10.
- [9] Kokun, O.M., Pishko, I.O., Lozinska, N.S., Kopanytsia, O.V., Herasymenko, M.V., & Tkachenko, V.V. (2012). [Collection of methods for diagnosing leadership qualities of cadet, sergeant, and officer personnel: Methodological guide](#). Kyiv: Research and Development Center of the Armed Forces of Ukraine.
- [10] Kryvoshey, O.O., & Selyukova, T.V. (2020). [Achievement motivation as an important factor of success in career building](#). In *Collection of scientific papers of the participants of the international scientific and practical conference* (pp. 68-71). Odesa: NGO "Southern Foundation for Pedagogy".
- [11] Lukasheva, Yu.V., & Chemodurova, Yu.M. (2024). [Psychological features of women in early adulthood with different levels of life satisfaction](#). Zaporizhzhia: Zaporizhzhya National University.

- [12] McClelland, D.C. (2009). *Human motivation*. Cambridge: Cambridge University Press.
- [13] Melashchenko, J., & Hrydkovets, L. (2021). Level of psychological well-being in working mothers. *Herald of Kyiv Institute of Business and Technology*, 47, 53-63.
- [14] Mishykha, L.P., & Kravchenko, V.Yu. (2022). Features of psychological well-being in women during middle adulthood. *Scientific Bulletin of Uzhhorod National University. Series: Psychology*, 2, 20-24. doi: 10.32782/psy-visnyk/2022.2.4.
- [15] Mukhina, L.M. (2024). Features of achievement motivation and avoidance of failures in the student collective. *Habitus*, 93-97. doi: 10.32782/2663-5208.
- [16] Olefir, V., & Bosnyuk, V. (2024). Adaptation of the Ukrainian version of E. Diener's satisfaction with life scale. *Science and Education*, 2, 64-72. doi: 10.24195/2414-4665-2024-2-9.
- [17] Pasechnikova, L.P. (2008). *Formation of a successful personality: Methodological recommendations*. Donetsk: Kashtan.
- [18] Poviakel, N.I. (1999). *Psychological preconditions for the formation of a positive self-concept as a basic component of a psychologist's professional self-determination*. (PhD dissertation, Ternopil State Pedagogical University named after V. Hnatiuk, Ternopil, Ukraine).
- [19] Pryadko, N.O. (2015). *Achievement motivation as a determinant of success in professional activity*. *Bulletin of Chernihiv National Pedagogical University. Series: Pedagogical Sciences*, 127, 177-180.
- [20] Shcherbatyuk, B.A. (2006). *Psychological features of self-determination in women oriented toward managerial activities*. (PhD thesis, G.S. Kostyuk Institute of Psychology of the Ukrainian Academy of Sciences, Kyiv, Ukraine).
- [21] Ustymenko, I., & Harchenko, A. (2022). *Features of psychological well-being in working and non-working women*. *Scientific Collection "InterConf"*, 135, 198-200.
- [22] Venger, O.P., Guseva, T.P., Mysula, Yu.I., Sas, M., Smashna, O.Ye., Bilous, V.S., Liuta, O.O., & Nestorovysch, Ya.M. (2018). Achievement motivation as an important factor in the successful professional development of medical students. *Medical Education*, 4, 31-35. doi: 10.11603/me.2414-5998.2018.4.9388.
- [23] Werdhiastutie, A., & Suhariadi, F., & Partiwi, S. (2020). Achievement motivation as antecedents of quality improvement of organizational human resources. *Budapest International Research and Critics Institute (BIRCI-Journal): Humanities and Social Sciences*, 3(2), 747-752. doi: 10.33258/birci.v3i2.886.
- [24] Zagrai, L., & Symovonik, S. (2022). Achievement motivation of it sector employees: Diagnostic dimensions and research indicators. *Personality Psychology: Scientific Theoretical-Methodological and Applied Psychological Journal*, 12(1), 42-48. doi: 10.15330/ps.12.1.42-48.
- [25] Zhilkina, I.Yu., & Kondratyuk, S.M. (2020). Features of psychological well-being in early adulthood among women. *Scientific Bulletin of Kherson State University*, 33-40. doi: 10.32999/ksu2312-3206/2020-1-5.
- [26] Zhivak, M. (2023). *Marital and family relations as a factor in women's professional self-realization*. Ternopil: TNTU.

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Вплив мотивації досягнення у жінок на задоволеність професійною та особистісною сферами життя

Анотація. Актуальність теми дослідження зумовлена сучасними тенденціями у суспільстві, де триває активна дискусія щодо гендерної рівності. Сучасні тенденції сприяють самореалізації жінок і розкриттю їхнього особистісного потенціалу. Метою даної статті було проаналізувати особливості впливу мотивації досягнення у жінок на задоволеність професійною діяльністю та особистісним життям. Для досягнення мети використовувалися наступні методи: методика діагностики мотивації до успіху Т. Елерса, шкали психологічного благополуччя К. Ріфф, шкала задоволеності життям Е. Дінера. Виконано порівняльний аналіз серед отриманих даних у працюючих і непрацюючих жінок; заміжніх або у стосунках і у жінок без відносин; у жінок, що мають дітей, і тих, хто не має. Запропоновано інтерпретацію отриманих результатів. Дослідження показало, що працюючі жінки, а також жінки, що мають дітей, і ті, хто перебуває у стосунках або заміжні, – частіше мають високий рівень психологічного благополуччя та задоволеності життям. Вищі показники задоволеності життям спостерігалися серед одружених жінок і тих, хто має дітей. Було встановлено, що рівень мотивації та задоволеності певною мірою пов'язані між собою: чим вища мотивація, тим кращі показники психологічного благополуччя та задоволеності життям. Жінки з високим рівнем мотивації схильні досягати більше успіху в різних сферах життя: у професійній кар'єрі, у побудові стосунків, створенні сім'ї та народженні дітей. Практична цінність даного дослідження полягає у створенні методичних рекомендацій, спрямованих на розвиток мотивації досягнень у жінок. Вони допоможуть сприяти самореалізації в різних сферах діяльності та досягненню гармонії між професійним і особистим життям.

Ключові слова: сімейне життя; кар'єра; самореалізація; професійний розвиток; психологічне благополуччя

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Empirical analysis of the correlation between levels of frustration and forms of aggressive behaviour in adults

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Abstract. The relevance of this study stems from the increasing manifestations of aggressive behaviour among adults in response to rising levels of frustration amid contemporary social instability. The aim of the research was to establish the relationship between the degree of frustration and expressions of aggression in adult residents of Ukraine. The methodological framework comprised quantitative psychodiagnostic tools, including questionnaires, standardised tests, and statistical methods of data analysis. The study was conducted from April to June 2024 and involved 158 participants aged 34-53 from various regions of Ukraine. The findings revealed that 63.3% of respondents exhibited moderate to high levels of frustration, accompanied by pronounced aggressive tendencies. A statistically significant positive correlation was found between the "obstacle-dominance" type of frustration response and levels of verbal and indirect aggression. The highest levels of aggression were observed in individuals with elevated anxiety and rigidity, indicating a link between emotional tension and a propensity for aggression. Scores on the guilt scale demonstrated an inverse relationship with the intensity of aggressive behaviour, suggesting a moderating effect. In a separate subsample of 30 individuals, a strong positive correlation ($r = 0.68$) was observed between frustration indicators and indirect aggression. Among those with heightened irritability, high levels of negativism were recorded, coupled with low guilt scores. These results point to the existence of a complex psycho-emotional profile in which frustration acts as a trigger for aggressive responses. The conclusions affirm that frustration is a key factor influencing both the form and intensity of aggressive behaviour. Moreover, the type of response to frustration determines the specific manifestation of aggression. The practical significance of this study lies in the potential to develop psychological intervention programmes for aggression prevention, tailored to individual frustration levels and dominant response types

Keywords: negativism; hostility; irritability; emotional tension; dominant type of response

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INTRODUCTION

Over the past decades, the problem of aggression in society has remained one of the most pressing issues concerning individual psychological well-being. The rise in conflict across social, professional, educational, and domestic environments has been accompanied by an escalation in aggressive behaviour, manifested in both verbal and physical forms. This phenomenon has become particularly pronounced during periods of instability – economic

downturns, political uncertainty, and social transformations – often coinciding with personal life crises. In such circumstances, the level of frustration among a significant portion of the population has increased, triggering both internal psychological conflicts and external manifestations of destructive behaviour. These contexts have highlighted the need for a deeper scientific understanding of the relationship between frustration and manifestations of

aggression in adult populations. Frustration, as a psychological state resulting from the inability to attain a goal or satisfy a need, has become increasingly common among adults, particularly in relation to perceived loss of control over life events. Simultaneously, aggression – as a response to internal tension and disappointment – has evolved into new forms and acquired broader meanings, ranging from passive aggression to overt violence. In psychological research, growing attention has been directed towards frustration as a trigger for aggression, necessitating interdisciplinary analysis that encompasses socio-psychological, cognitive, biological, and cultural dimensions.

Recent scientific studies have expanded understanding of various facets of this issue. For instance, N. Chitrakar & P. Nisanth (2023) explored the impact of frustration on students' motivation and academic performance. They found that high levels of frustration in academic settings adversely affected learning outcomes, leading to feelings of hopelessness and diminished self-esteem. Although their work did not directly address aggression, it indirectly highlighted its psychological precursors.

S. Arif & S. Al Hassan (2022) examined organisational frustration among employees in Pakistan's telecommunications sector, discovering that breaches of the psychological contract significantly increased destructive workplace behaviours. Their survey statistically demonstrated that feelings of betrayal by employers provoked aggressive responses, thereby exacerbating conflict and employee turnover. A different approach was taken by D. Scheinost *et al.* (2021), who investigated the neurobiological basis of irritability in children in response to frustration. Using functional magnetic resonance imaging during a challenging task, they found that individual differences in the functioning of motor-sensory brain networks correlated with frustration responses. These findings opened avenues for identifying biological markers of irritability as potential predictors of aggression.

Working within a cultural-psychological framework, E. Maalouf *et al.* (2022) studied the relationship between attachment styles and aggression among Lebanese adolescents. Their findings showed that insecure attachment styles heightened anger and predisposed individuals to aggression, while secure attachment reduced this risk. The study underscored the importance of interpersonal dynamics in shaping emotional responses. The study by C. Khadka (2024), grounded in social learning theory, offered valuable insights into the mechanisms underlying the formation of aggression. Referencing Bandura's Bobo doll experiment, the author demonstrated how exposure to aggressive behaviour in adults led children to replicate similar behaviours. This supported the conclusion that the social environment – particularly the media – plays a critical role in fostering aggressive tendencies. Finally, P. Sturme (2022) conducted a retrospective review of aggression theories, tracing developments from Freudian constructs to modern integrative models. He illustrated the evolution of psychological thought from reductionist explanations, such as the hydraulic model of aggression, towards more

complex frameworks that incorporate biological, psychological, and social factors.

W. Ozuem *et al.* (2024) identified an unexpected context for frustration – the domain of digital services. Their study explored customer reactions to chatbot failures, which elicited frustration that subsequently triggered aggressive responses such as complaints, negative reviews, or service boycotts. Four distinct types of customer reactions were identified, enabling the formulation of strategies to improve user interaction. S. Tordjman (2022) proposed an interpretation of aggression as a communicative act, wherein the interaction between aggressor and victim created a vicious cycle of violence. This model underscored the significance of social context and proposed three levels of intervention: individual, interpersonal, and systemic. Despite the diversity of existing approaches, the problem of clearly differentiating between frustration and aggression remains insufficiently addressed in contemporary scientific discourse. A particular complication arises in interpreting situations where frustration serves merely as a background condition rather than a direct source of aggression. The ambiguity of definitions, overlapping terminology, and the absence of unified diagnostic criteria hinder the accurate analysis of the relationship between these phenomena.

A persistent theoretical issue concerns the challenge of delineating the boundary between frustration as an emotional response to an obstacle, and aggression as a behavioural reaction aimed at alleviating that tension. In practical psychology, these concepts are often used interchangeably, which contributes to methodological inconsistency and complicates empirical measurement. The purpose of the present study was to undertake a psychological analysis of the relationship between frustration-induced tension and aggressive behaviour among the adult population of Ukraine within the context of the modern social environment. In pursuit of this aim, the following objectives were formulated: to analyse scientific approaches to understanding the nature of frustration and aggression in the psychological literature; to conduct an empirical investigation into the levels of frustration and aggression among adult respondents; and to identify statistically significant relationships between individual indicators of frustration and types of aggressive behaviour.

MATERIALS AND METHODS

Within the framework of the study aimed at identifying the relationships between the level of frustration and manifestations of aggressive behaviour in adults, a comprehensive methodological approach was applied, combining quantitative psychodiagnostic methods and analytical procedures for statistical data processing. The choice of methods was due to the need for a deep and multifaceted study of both the subjective assessments of respondents regarding their own emotional state and objective manifestations of aggressive tendencies in behaviour, given their potential causality with frustration factors. To identify sociocultural factors that influence frustration and aggression in adults,

content analysis of scientific sources (psychological, sociological and cultural studies) and comparative cultural analysis of empirical studies covering different types of social contexts (individualistic and collectivist cultures) were used. The study included 158 adult respondents aged 34 to 53 years living in different regions of Ukraine during the period April-June 2024. The sample was uneven in terms of gender, with a predominance of women (140 people, or 88.6%) over men (18 people, or 11.4%). This sample structure reflects both the characteristics of the availability of respondents and the empirical focus on identifying the characteristics of aggressive behaviour in the socially active part of the population, in particular among people who regularly face psycho-emotional stress. The main criteria for inclusion in the sample were working age (16-59 years for men and 16-54 years for women), the absence of a history of serious mental illnesses, and voluntary consent to participate in the study.

In order to ensure the relevance and accuracy of the data obtained, four complementary methods were used. The first of them is the author's questionnaire, specially designed to assess the level of frustration. The questionnaire consisted of 15 statements concerning the frequency of feelings of hopelessness, irritation, emotional exhaustion and despair. Each statement was assessed on a 5-point Likert scale, where 1 meant complete disagreement and 5 meant complete agreement. The sum of the points allowed classification of the level of frustration as low (15-30 points), medium (31-60 points) or high (61-75 points). This tool provided the initial stratification of respondents by the degree of emotional tension, which allowed further comparison of these levels with manifestations of aggressive behaviour. The second key tool was the frustration reaction technique of S. Rosenzweig (1976), adapted for the Ukrainian sample. This technique is based on the interpretation of pictorial situations that provoke a frustrating experience, with subsequent analysis of the nature of the respondent's response. Particular attention was paid to the type of objective-intro-punitive reaction (OD), which involves blaming external factors or circumstances for the emergence of a problematic situation. The collected responses made it possible to establish not only the dominant type of frustration reaction in each participant, but also to quantitatively assess its intensity, which became the basis for further statistical comparisons. The third stage of the study was the diagnosis of aggressiveness levels using the Bass-Darka method adapted by A.K. Osnytsky (Stepaniuk & Melnychenko, 2020). This standardised questionnaire allows measurement of the intensity of eight parameters of aggressive behaviour: physical, verbal and indirect aggression, negativism, irritability, suspicion, hurtfulness and guilt. Each of the parameters was evaluated in points, which allowed not only the identification of the general level of aggressiveness, but also the determination of its dominant forms in each respondent. Special attention was paid to the guilt scale as a potential internal regulator of aggressive behaviour. The Self-Esteem of Mental States (Eysenck) (n.d.) method was used to

diagnose four key psychological states: anxiety, frustration, aggressiveness and rigidity. This test allowed identification of the level of severity of these states in each respondent, as well as an understanding of the general emotional background and the degree of psycho-emotional tension.

For an in-depth analysis of the relationship between the OD type of frustration reactions (predominance of reactions to an obstacle) and forms of aggression, 30 respondents were selected from the total sample (N = 158). The selection criterion was a high level of the OD type (≥ 6 points according to the S. Rosenzweig method). Within this group, a correlation analysis was conducted, which involved comparing the quantitative value of OD with the levels of verbal and indirect aggression according to the Bass-Darky scales (Stepaniuk & Melnychenko, 2020). The analysis was carried out using the Pearson correlation coefficient, which allowed the identification of a linear relationship between the variables. The role of guilt as a factor that potentially moderates or inhibits aggressive behaviour was also analysed. For this purpose, a separate subsample of 40 adult respondents aged 21 to 45 years was formed. In this sample, the values of the irritability, hostility and guilt scales were assessed, allowing the relationships between these indicators to be traced. The use of the Pearson formula ensured the reliability of the statistical results and enabled a deeper interpretation of the mechanisms of internal regulation of aggression under conditions of frustration.

In view of compliance with the ethical norms of the study, all participants were familiarised with the purpose, objectives and conditions of participation in the research procedure. The voluntary participation of respondents was ensured by obtaining written informed consent, and the anonymity of the results was guaranteed. Personal information was not collected or stored in order to maintain confidentiality. All research procedures complied with the basic principles of psychological ethics set out in the Code of Ethics for Psychologists (2015), in particular the principles of respect for the individual, non-maleficence, ensuring voluntary participation, confidentiality, and informed consent.

RESULTS

Theoretical basis for studying frustration and aggressive behaviour

Frustration is one of the fundamental topics in psychology, addressing the relationship between human needs, goals, and the obstacles to their realisation. In psychological literature, frustration is understood as a specific emotional state that arises when an individual encounters an insurmountable or unexpected obstacle in the pursuit of a vital need or the attainment of a significant goal (Park & Ramirez, 2022). From the standpoint of general psychology, frustration is not synonymous with a narrowly defined emotional reaction (such as anger or fear), but encompasses a broader spectrum of manifestations – ranging from anxiety to behavioural disorganisation. It is this state that frequently acts as a trigger for the development of aggression, activation of psychological defence mechanisms, formation of neurotic

traits, or conversely, mobilisation of efforts to overcome the obstacle. Psychologists classify frustration not only by its source (physical barriers, social constraints, internal conflicts), but also by the types of frustration reactions formed in response to a frustrating situation (Toxanbayeva *et al.*, 2024). These reactions vary significantly depending on individual personality traits, previous experiences, cognitive assessment of the situation, and the surrounding social context. A critical factor is the direction in which the individual's frustrated response is channelled.

In contemporary psychology, the following principal types of frustration reactions are distinguished: A reaction directed towards an external source, where the individual attributes responsibility for the frustrating situation to an external object (another person, a social group, or circumstances), which they perceive as having deliberately or inadvertently blocked the achievement of their goal. This often manifests in aggression, blame, or conflictual behaviour and is the most prevalent reaction type in interpersonal contexts. A reaction directed at the obstacle itself, where in the individual attempts to overcome the difficulty, solve the problem, or change the situation. This can involve both constructive efforts (seeking alternatives, increasing exertion) and destructive behaviours (irritation, unproductive persistence). It is a potentially mobilising response, typically linked with heightened internal tension and motivational drive. A reaction directed inward, characterised by the internalisation of responsibility for the frustrating event – where the individual believes they failed due to a lack of ability or insufficient effort. This is accompanied by feelings of guilt, reduced self-esteem, self-blame, heightened anxiety, and in some cases, depressive tendencies or the development of learned helplessness. These three types of reactions may coexist or shift depending on the situational context, but each reflects a distinct individual style of coping with adversity. It is essential to emphasise that frustration, in itself, is not a pathological condition: it serves a vital adaptive function by prompting individuals to reassess their situation, modify their behavioural strategies, or mobilise internal resources. However, when frustration is intense, chronic, or combined with insufficient psychological resilience, it can lead to destructive outcomes for the individual's psycho-emotional well-being. Aggression in psychology is regarded as a complex and multifaceted phenomenon that may manifest as an adaptive response to frustration or as a maladaptive behavioural strategy in response to prolonged psycho-emotional stress (Mostova, 2023). Aggression, when functioning as a form of adaptation to frustration, can serve protective or compensatory purposes (Devilly *et al.*, 2023). In such cases, aggressive behaviour is a reaction to a threat or obstacle, enabling the individual to temporarily preserve the integrity of the self, increase control over the situation, or influence external circumstances. In certain contexts, this type of aggression is even considered socially acceptable – for instance, assertiveness, which allows individuals to defend their rights without causing harm to others. However, aggression may also represent a form of

maladaptation when it becomes a persistent behavioural pattern that damages social relationships, provokes conflict, or disrupts the individual's psycho-emotional equilibrium (Navas-Casado *et al.*, 2023). It is this latter form of aggression that is most commonly associated with chronic frustration, social isolation, or personal vulnerability.

There are several principal approaches to explaining the nature of aggression within the context of frustrating situations: psychoanalytic, cognitive, and socio-psychological theories. Each of these perspectives highlights distinct aspects of the interplay between aggression, personality, and environment. According to the psychoanalytic approach, aggression is an innate instinct that emerges as a component of the unconscious psyche (Perkel, 2023). S. Freud conceptualised aggression as a consequence of internal conflict between the life instinct – Eros – and the death instinct – Thanatos (Ullah *et al.*, 2021). Within this framework, frustration activates destructive impulses, which may be expressed through aggression or self-destructive behaviour. Later psychoanalysts, particularly A. Freud & H. Sullivan, emphasised the significance of psychological defence mechanisms (such as projection and rationalisation) that help individuals manage aggressive impulses (Saleh, 2022). When these mechanisms are ineffective, aggression may become overt or manifest in behaviour that contravenes social norms.

Cognitive concepts of aggression view it as the result of specific patterns of information processing and event interpretation. According to A. Bandura's (2024) social learning model, aggressive behaviour is not innate but formed through imitation, learning via reinforcement, and observation. In this context, aggression in response to frustration arises when an individual has learned to react in such a manner under stressful conditions. A critical factor is the presence of cognitive schemas that determine how the individual perceives obstacles – whether as a threat, an injustice, or a personal insult. For example, if a person holds beliefs about the world's hostility or exhibits low frustration tolerance, the likelihood of an aggressive reaction increases. Such cognitive distortions may reinforce aggressive behaviour patterns, which over time become automatised.

Social-psychological theories emphasise the influence of the social environment, interpersonal relationships, and cultural norms on the development and expression of aggression. The frustration-aggression hypothesis, formulated by J. Dollard *et al.* (2013) posited that all frustration leads to aggression, and all aggression stems from frustration (Etim & Ukpere, 2023). However, the theory has since been revised, acknowledging an intermediate stage of cognitive appraisal between frustration and aggression. Aggressive behaviour is more likely when the obstacle is perceived as unfair, deliberate, or humiliating. Concurrently, the social context – norms of behaviour, support systems, and conflict resolution culture – can either amplify or suppress aggressive responses. Notably, collectivist cultures tend to suppress direct aggression, whereas individualistic cultures permit more open expression. The universality of this mechanism lies in its reflection of both the internal

emotional state of the individual and their adaptive capacity in the face of environmental changes. Adaptive aggression may help overcome obstacles, provide self-defence, or enable environmental change. Conversely, maladaptive aggression is indicative of psycho-emotional disorganisation and may necessitate corrective intervention or psychotherapeutic support (Drndarević, 2021).

One of the most influential frameworks for categorising aggression is the typology proposed by Arnold Bass and Albert Darkie (Yuldasheva & Ergashova, 2021). This typology enables differentiation of aggressive behaviour by its manifestations and direction, which is essential for understanding the deeper mechanisms of frustration and maladaptation. Physical aggression is a direct form of destructive behaviour involving physical harm to another individual or object. It includes acts such as hitting, pushing, object destruction, and in extreme cases, violent conduct. In the context of frustration, physical aggression is typically an impulsive response to an obstacle that provokes intense emotional tension. This form of aggression is closely associated with biological factors, particularly in cases involving low stress tolerance, impaired self-control, or neurological dysfunctions. Verbal aggression entails the use of language as a means of attack. It may manifest through insults, threats, shouting, sarcasm, or derogatory remarks. As a socially mediated form of expressing negative emotion, verbal aggression enables individuals to release tension without resorting to physical violence. However, in some cases, it is equally destructive – especially when targeting the vulnerable aspects of the interlocutor's identity. Under frustration, verbal aggression often becomes the most common reaction, especially in situations where physical confrontation is socially unacceptable or impracticable. Indirect aggression refers to forms of aggression that are not overtly directed at the source of frustration or lack an explicit target. It may include gossip, passive-aggressive behaviour, backbiting, social exclusion, or sabotage. Indirect aggression frequently results from internal conflict or external social constraints, wherein the individual is unable to express irritation openly. This form of behaviour is often observed in individuals with low self-esteem or within authoritarian environments where overt dissent may lead to punishment.

Hostility in the Bass-Darki structure is regarded as a stable personality trait that reflects a general mistrust of others, a tendency to attribute malevolent intentions to them, and an expectation of negative attitudes from them (Savca, 2018). Unlike situational aggression, hostility is relatively enduring and develops on the basis of negative life experiences or cognitive distortions. An individual with a high level of hostility is prone to hypersensitivity to social stimuli and tends to interpret neutral situations as threatening, thereby increasing the likelihood of conflictual behaviour. Hostility serves as a background upon which other forms of aggressive responses are built, particularly in situations marked by frustration or interpersonal tension. Irritability represents the emotional component of aggressive behaviour, characterised by a low threshold for

the emergence of negative emotions in response to minor stimuli. Irritable individuals tend to lose self-control easily and often exhibit anger, discontent, and intolerance. Within the Bass-Darki typology, irritability is considered one of the key indicators of emotional regulation instability. It may be symptomatic of temporary overexertion or indicative of deeper psycho-emotional disturbances. Under conditions of frustration, irritability functions as a kind of “trigger” for the emergence of other forms of aggression – both verbal and physical.

Suspicion is another critical component of aggressive behaviour, manifesting in a tendency to interpret others' actions as hostile or personally directed. It is frequently accompanied by fears of being deceived, manipulated, or betrayed. For such individuals, frustration elicits not only aggression but also defensive mechanisms aimed at avoiding perceived threats, even when such threats are illusory. Suspicion is closely associated with hostility, though it involves a more pronounced emotional component – namely anxiety, distrust, and hypervigilance. Offensiveness refers to a propensity to overreact to remarks, criticism, or even neutral statements perceived as personal attacks. This form of aggression is typically not expressed outwardly but results in the internal accumulation of tension, which may eventually manifest as indirect or passive aggression. Individuals with high levels of offensiveness often become particularly vulnerable to frustration, lacking effective mechanisms for emotional release. The final component in the Bass-Darki model is negativism – the tendency to resist external influence and to reject demands or expectations, even in neutral situations. This may present as stubbornness, oppositional behaviour, or passive resistance. In conditions of frustration, negativism can serve as a strategy for preserving autonomy or compensating for a perceived loss of control.

Aggression and frustration, as psycho-emotional states, do not emerge in a social vacuum; rather, they are shaped by the ongoing interaction between the individual and the socio-cultural environment (Slipetska *et al.*, 2023). Among the key sociocultural determinants influencing aggressive behaviour and frustration responses are social norms, economic conditions, cultural values, media discourse, gender stereotypes, and parenting styles. Social norms define the boundaries of acceptable conduct, either sanctioning or inhibiting expressions of aggression. In cultures characterised by high levels of collectivism (e.g., East Asian countries), aggression tends to be socially condemned, whereas in individualistic cultures (e.g., the United States), direct emotional expression – including aggressive forms – is more often tolerated (Salin, 2021). Thus, the social context establishes the framework within which individuals respond to frustration. Economic inequality and social instability are significant contributors to chronic frustration. In environments marked by constant stress, limited access to resources, and constrained opportunities for personal fulfilment, individuals are more likely to develop a hostile outlook towards the external world. Frustration arising from systemic injustice often evolves into verbal or physical aggression.

Cultural values, such as the cult of power, competitiveness, or dominance, may legitimise aggressive behaviour. For instance, in societies that uphold authoritarian models of interaction or valorise aggressive masculinity, displays of dominance are often regarded as indicators of competence or leadership (O'Dea *et al.*, 2022). Such cultural contexts foster an internal readiness to respond aggressively in situations of frustration. Media and digital culture have become powerful forces in shaping tolerance towards aggression. The portrayal of violence as normative in films, social media, and video games contributes to the desensitisation to aggressive acts and facilitates their internalization – particularly under conditions of recurrent frustration. Equally significant is the influence of socialisation, particularly parenting style, which lays the groundwork for the development of emotional regulation mechanisms (Rahimov *et al.*, 2024). Authoritarian, repressive, or inconsistent upbringing diminishes a child's ability to resolve conflicts constructively and heightens emotional instability, making the individual more susceptible to frustration and more prone to aggression in response to setbacks. Gender stereotypes also play a crucial role by establishing socially sanctioned behavioural models. For example, men are more often encouraged to express strength and dominance openly, whereas women are expected to exhibit passivity or emotional restraint. As a result, states of frustration tend to manifest through different forms of aggression: among men, more commonly as direct physical aggression; among women, as verbal or passive-aggressive behaviour (Mahmood *et al.*, 2024).

In psychological science, the relationship between frustration and aggression is central to understanding the mechanisms of destructive behaviour. The theoretical exploration of this relationship dates back to the first half of the 20th century and has undergone numerous refinements, elaborations, and critiques from various academic perspectives (Alam, 2023). The most prominent and foundational framework is the frustration-aggression hypothesis, originally formulated by J. Dollard and colleagues in 1939 and later expanded upon by L. Berkowitz during the 1960s-1980s (Asangausung *et al.*, 2025). These models provided the groundwork for subsequent research in aggressive behaviour, emotional regulation, and social interaction.

The frustration-aggression hypothesis, as proposed by J. Dollard *et al.* (2013) posited that frustration – defined as the blocking or thwarting of goal-directed behaviour – invariably leads to aggression. According to this theory, aggression is viewed as an automatic, almost reflexive response to a frustrating stimulus. The classical formulation holds that every act of aggression stems from prior frustration and that all instances of frustration inevitably give rise to aggression. This model offers several analytical strengths. Firstly, it highlights a clear causal link between the emotional state of frustration and the behavioural expression of aggression. Secondly, it provides a generalised framework for predicting the emergence of aggressive behaviour under conditions of psycho-emotional strain.

However, the model's deterministic linearity has also attracted criticism. Researchers have pointed out that not all frustration results in aggression, nor is all aggression necessarily triggered by frustration. For example, individuals may respond to frustrating circumstances with anxiety, avoidance, withdrawal, or efforts to compromise, rather than through overtly aggressive acts.

In response to these observations, L. Berkowitz in the 1960s proposed a revised model of the relationship between frustration and aggression, retaining the central premise but introducing important refinements. In his interpretation, frustration is not a direct cause of aggression but rather a factor that increases the likelihood of its occurrence under certain conditions. L. Berkowitz emphasised that frustration induces a negative emotional state, which in turn may lead to aggression – but only when aggressive cues or signals are present in the environment. Such cues might include weapons, hostile gestures, aggressive language, and similar stimuli. This approach is referred to as the cognitive activation model of aggression. The core of L. Berkowitz's argument is that aggression is not an inevitable response to frustration; instead, it depends on how the individual interprets the situation, their previous experiences, internalised behavioural scripts, and external stimuli. If the frustrated individual activates aggressive thoughts or behavioural patterns, aggression becomes more probable. Conversely, if other emotional or cognitive constructs – such as guilt, fear, shame, or internalised social norms of restraint – predominate, aggression may not occur at all. L. Berkowitz also underlined the emotional determinants of aggression, particularly the role of anger. According to his theory, anger functions as a mediator between frustration and aggression: frustration provokes anger, and anger in turn activates aggressive tendencies. Nonetheless, even intense frustration does not necessarily lead to aggression if the individual does not experience anger or is capable of regulating it constructively. L. Berkowitz's model has significant practical implications. It provides a theoretical basis for the development of aggression prevention strategies through the reduction or elimination of aggressive cues, the enhancement of emotional regulation skills, and the cognitive reappraisal of frustrating events. This approach is especially pertinent in psychological work with children and adolescents, as well as in therapeutic interventions for aggression in situations of stress or interpersonal conflict (Salman & Aleem, 2024).

In addition to L. Berkowitz's contributions, more complex integrative models have emerged in recent decades, incorporating concepts of frustration within biopsychosocial, neuropsychological, and socio-cognitive frameworks. For instance, the general affective aggression model examines how various individual and situational variables interact with frustrating stimuli to shape aggressive responses (Gómez-Leal *et al.*, 2022). Within this framework, personality traits such as impulsivity or hostility, previous life experiences, motivational orientations, and cognitive appraisal of the context all play crucial roles. Thus, the

development of theoretical models on the frustration-aggression relationship illustrates a clear shift from linear, single-cause explanations towards multidimensional and interactive systems. In these systems, aggression is conceptualised as a complex, contextually conditioned response. Understanding such models is essential for the effective diagnosis, prevention, and correction of aggressive behaviours, as well as for the formulation of adaptive strategies for coping with frustration in contemporary society.

Empirical study of frustration and aggressive behaviour

The results of the author's questionnaire revealed that 17.7% of respondents (28 individuals) exhibited a low level of frustration, while 53.2% (84 individuals) demonstrated a moderate level, and 29.1% (46 individuals) reported a

high level of frustration. This distribution indicates a substantial prevalence of frustrated emotional states among the adult population, potentially influencing both behavioural patterns and psycho-emotional well-being. The significant proportion of individuals with a high level of frustration reflects the chronic experience of psychological discomfort, which may escalate into destructive behavioural forms – particularly aggression. To explore the mechanisms of response in frustrating situations in greater detail, the Frustration Reaction Test by S. Rosenzweig (1976) was employed. This method allows for the identification not only of the type of reactions but also their directional focus, which is essential for interpreting an individual's psychological profile. The results of the method for a selected subgroup of respondents are presented in Table 1.

Table 1. Distribution of frustration reaction types according to the S. Rosenzweig method (in %)

Direction of reaction	OD "with fixation on the obstacle"	Types of reactions ED "with a fixation on self-defence"	NP "necessarily unstable"	Total number	Norm
ED – external circumstances accusation	21.4	12.2	4.8	38.4	40
ID – self-blame	15.3	14.5	9.1	38.9	30
M – conflict minimisation	3.2	6.1	12.7	22	30
Total number	39.9	32.8	27.3	100	

Note: ED – extrapunitive type; ID – intropunitive type; M – impunitive type

Source: compiled by the author based on answers to the frustration reaction test by S. Rosenzweig (1976)

According to the data obtained, the highest proportion among the types of reactions was OD-reactions ("fixed on the obstacle") – 39.9%. This indicates a predominance of external focus in the experience of frustration: respondents tend to concentrate on the obstacle itself rather than on strategies for overcoming it. Such a focus may manifest as excessive rumination on difficulties and fixation on adverse external conditions, which, over time, can lead to a decline in personal efficacy. The second most common type of reaction was ED ("fixed on self-defence") – 32.8%, suggesting a tendency among respondents towards defensive behaviours, particularly in the form of justifying their own actions, shifting responsibility, and avoiding feelings of guilt. The lowest proportion was observed for NP-reactions (27.3%) – behaviours indicative of instability in needs and a lack of goal orientation when faced with frustration. The

analysis of the direction of frustration reactions revealed that 38.4% of respondents demonstrated reactions with an external orientation, i.e., their frustration was projected onto external factors. An almost equal proportion (38.9%) exhibited an internal orientation (I), indicating the presence of introspection, self-reflection, and self-criticism. Meanwhile, 22% of reactions were classified as neutral (M) or unique, suggesting a tendency to avoid direct confrontation with the frustration-inducing factor. This distribution of reaction directions suggests that the studied group possesses a certain degree of internal self-regulatory capacity. However, the notable proportion of externally oriented reactions highlights a prevalent inclination to attribute difficulties to external causes. The results of the Bass-Darky technique conducted on a subgroup of respondents are presented in Table 2.

Table 2. Method for assessing an individual's tendency towards aggressive behaviour by A. Bass and A. Darki (adapted by A.K. Osnytsky)

Form of aggression	Low level	Intermediate level	High level
Physical aggression	67.1	21.5	11.4
Verbal aggression	19.6	53.8	26.6
Indirect aggression	22.2	50.6	27.2
Negativism	16.5	43.7	39.8
Irritability	23.4	43.1	33.5
Tendency to be suspicious	35.4	43.1	21.5
Hurt	29.1	36.7	34.2
Feelings of guilt	27.2	37.3	35.5

Source: compiled by the author based on responses to the methodology by A. Bass and A. Darki (Stepaniuk & Melnychenko, 2020)

The results of the methodology revealed that the largest proportion of respondents exhibited a low level of physical aggression (67.1%). This may be attributed to both the demographic characteristics of the sample (a significant proportion being middle-aged women) and socio-cultural factors that discourage the physical expression of aggression. However, the levels of verbal (26.6%) and indirect aggression (27.2%) were relatively high, which suggests a transformation of aggressive impulses into indirect or socially acceptable forms. This is further supported by elevated indicators of negative emotional states: high levels of negativism (39.8%), irritability (33.5%), and resentment (34.2%) reflect emotional instability, increased sensitivity to external stimuli, and a propensity for conflictual

behaviour. The high level of guilt observed in some respondents (35.5%) merits particular attention, as it indicates the presence of an internal conflict between the inhibition of aggressive expression and the existence of aggressive impulses. Such contradictions may result in chronic psychological stress, contribute to somatisation, and reduce overall psycho-emotional well-being. Furthermore, the elevated level of offensiveness (34.2%) may be attributed not only to subjective sensitivity, but also to frustration arising from unmet needs and social constraints. Analysis of the results of the Self-Esteem of Mental States test indicated that the majority of study participants demonstrated an average level of psycho-emotional states – namely anxiety, frustration, aggressiveness, and rigidity – as presented in Table 3.

Table 3. Results of testing subgroups using the self-esteem of mental states method (Eysenck)

Mental state	Low level	Intermediate level	High level
Anxiety	19.9	45.7	35.4
Frustration	18.3	54.4	27.2
Aggressiveness	22.2	54.4	23.4
Rigidity	27.4	56.3	19

Source: compiled by the author based on responses to the Self-Esteem of Mental States (Eysenck) technique (n.d.)

The results of testing using the Self-Esteem of Mental States method indicate that a significant proportion of respondents exhibit elevated indicators, which may suggest heightened emotional tension. Specifically, 35.4% of participants demonstrate a high level of anxiety, often associated with stressful conditions, while 27.2% show increased frustration, potentially reflecting difficulties in overcoming life obstacles. Additionally, 23.4% of respondents are prone to aggressive reactions, and 19% display rigidity, which may hinder adaptability to change. Although the majority of respondents fall within the average range (45.7% for anxiety; 54.4% for frustration and aggressiveness; 56.3% for rigidity), the presence of a considerable proportion with high levels of these states indicates potential risks to psycho-emotional well-being. This underscores the need for further diagnostic assessment and the development of psychological support measures aimed at reducing tension within the group.

Analysis of the relationship between frustration indicators and forms of aggression in adults

The behavioural characteristics of aggressiveness in the examined sample reveal a complex and contradictory picture of the dynamics of aggressive behaviour, which is mediated and shaped by social, psychological, and personal factors. Firstly, the results obtained using the A. Bass – A. Darki method (Stepaniuk & Melnychenko, 2020) indicated a predominance of low levels of physical aggression (67.1%) within the group. This suggests the existence of a significant social or internal prohibition on the direct, physical expression of aggressive impulses. In the context of the socio-demographic composition of the sample – namely, the predominance of female respondents – such a trend is expected, as traditional cultural models often instil a prohibition against overt aggression in women, viewing it as

socially inappropriate behaviour. Nonetheless, the role of individual psychological factors should not be overlooked, including well-developed mechanisms of self-control, a high degree of introversion (manifested by inward-directed aggression), and the presence of social restrictions that discourage direct aggressive responses. However, a low level of physical aggression does not imply the absence of aggressive tendencies per se. On the contrary, the findings demonstrate relatively high levels of verbal (26.6%) and indirect aggression (27.2%), which reflect the predominance of mediated or masked forms of hostility. Verbal aggression typically manifests through increased criticism, sarcasm, and accusations, while indirect aggression takes the form of covert harm – for example, passive resistance, gossip, or demonstrative ignoring. These forms can be regarded as compensatory mechanisms that allow the individual to regulate internal emotional tension by expressing aggressive impulses in socially acceptable ways.

This behavioural pattern aligns with the findings from the S. Rosenzweig test (1976), where 39.9% of responses were classified as OD-type (“fixation on the obstacle”), indicating a tendency to focus on frustrating factors in the external environment perceived as sources of aggressive tension. Furthermore, notable levels of irritability (33.5%), offensiveness (34.2%), negativism (39.8%), and guilt (35.5%) in the sample reflect a heightened emotional background of aggressive states, which may not always be overtly expressed in behaviour. These internalised emotional states can signal psychological discomfort and psycho-emotional overload, increasing the likelihood of emotional breakdowns or conflictual interpersonal interactions. In this context, the emotional sphere is saturated with aggression-coloured reactions that necessitate cognitive and behavioural regulation. A key factor underpinning

this behavioural configuration is the high level of frustration identified both by the author's questionnaire (53.2% moderate; 29.1% high) and the Eysenck method (frustration: 54.4% moderate; 27.2% high). The psycho-emotional state of frustration is known to be a potent trigger for aggressive reactions, particularly when needs remain unmet or goals are obstructed. This state is also associated with cognitive rigidity (19% with high rigidity according to Eysenck), which limits cognitive flexibility and promotes fixation on conflict-provoking stimuli.

Thus, the behavioural manifestations of aggression in this sample are characterised by a low frequency of overt physical aggression and a high prevalence of latent,

mediated forms. This pattern supports the conclusion that internally regulated forms of aggression predominate – where direct expression of negative emotions is inhibited but emerges through less conspicuous behaviours. Simultaneously, the presence of substantial frustration, rigidity, and emotional tension underscores the need for targeted psycho-correctional interventions aimed at developing emotional regulation, reducing destructive behavioural patterns, and enhancing adaptive capacities. Correlation analysis revealed a statistically significant positive relationship between fixation on the obstacle and the level of verbal aggression. The correlation analysis data are presented in Table 4.

Table 4. Correlation analysis of the relationship between frustration and levels of verbal and indirect aggression

Form of aggression	Level			Rating scale
Physical aggression	0.42	-0.1	0.58	
Verbal aggression	0.38	0.34	0.49	
Indirect aggression	0.12	0.55	0.2	
Irritation	0.45	0.2	0.3	
Hostility	0.1	0.52	0.18	
	ED	ID	Fixation on an obstacle	

Source: compiled by the author

The most pronounced positive correlation was observed between OD-type (obstacle fixation) reactions and verbal aggression ($r = 0.68$), as well as physical aggression ($r = 0.55$). This finding suggests that individuals who concentrate on the obstacle itself, without displacing responsibility either externally or internally, are more likely to exhibit direct and often impulsive aggressive behaviour – particularly in the form of verbal or physical attacks towards the perceived source of frustration. ID-type responses (self-blame) showed a moderate positive correlation with hostility ($r = 0.59$), irritability ($r = 0.53$), and indirect aggression ($r = 0.49$). These data support the hypothesis that individuals who internalise responsibility in frustrating situations are more prone to passive-aggressive behaviour, lowered mood, increased internal tension, and latent hostility – either towards themselves or others. ED-type responses, characterised by shifting blame to external factors, were most strongly associated with irritability ($r = 0.56$) and verbal aggression ($r = 0.47$), consistent with an externally directed reaction pattern. Respondents exhibiting this reaction style tend to express frustration through overt emotional outbursts, particularly in the

form of verbal aggression, as they attribute the source of the obstacle to external forces.

It is noteworthy that no strong or statistically significant correlations were found between any frustration types and physical aggression, aside from the moderate relationship observed with OD-type responses. This may reflect sociocultural constraints on the expression of physical aggression within the adult population, shaped by legal, moral, and ethical norms. Overall, the findings reveal a structured relationship between cognitive-emotional appraisal in frustrating situations and specific forms of aggressive behaviour. The type of response to frustration – shaped by how the individual interprets the obstacle – substantially influences behavioural outcomes, ranging from impulsive (physical) to verbal or latent (indirect) forms of aggression. These results contribute to a deeper understanding of emotional regulation mechanisms in interpersonal contexts and may inform psychological interventions aimed at correcting destructive behavioural tendencies. The results regarding the relationship between feelings of guilt and specific forms of aggressive behaviour – namely irritability and hostility – are presented in Table 5.

Table 5. Correlation analysis of the relationship between guilt and aggressive behaviour

Indicator	Guilt ↔ irritability	Guilt ↔ hostility
Correlation coefficient rr	-0.44	-0.51
Significance level (p-value)	<0.01	<0.01
Interpretation	Moderate inverse correlation	Noticeable inverse correlation

Source: compiled by the author

The results obtained indicate a statistically significant inverse relationship between guilt and both analysed forms of aggression. In particular, the correlation coefficient between guilt and irritability was -0.44 , representing a moderate negative correlation. This suggests that respondents with higher levels of guilt are less prone to affective reactions in the form of irritability. In other words, the internal experience of guilt functions as an emotional “brake”, reducing the likelihood of uncontrolled affective outbursts. An even stronger inverse relationship was observed between guilt and hostility, with a correlation coefficient of $r = -0.51$. This indicates a consistent tendency for increased internalised guilt to be associated with reduced levels of hostile attitudes. It can be inferred that a predisposition towards self-blame or remorse not only inhibits expressive forms of aggression but also diminishes cognitive components – particularly the inclination to interpret others’ actions as hostile, aggressive, or provocative.

Importantly, these correlations were statistically significant ($p < 0.01$), suggesting that the probability of these results occurring by chance within the sample is exceedingly low. Thus, the findings support the hypothesis that the feeling of guilt serves as a restraining factor on both the affective (irritability) and cognitive-motivational (hostility) dimensions of aggressive behaviour. From a theoretical standpoint, this pattern aligns with classical psychoanalytic theory, which posits guilt as a central mechanism in the development of the superego and the inhibition of impulsive actions. Within the cognitive-behavioural framework, these results may also be interpreted as evidence that self-reflection and emotional self-regulation mitigate tendencies towards outwardly directed aggression.

Although statistically significant inverse correlations were found between guilt and verbal or cognitive forms of aggression, no comparable relationship was identified with physical aggression. The correlation coefficient between guilt and physical aggression was low ($r = -0.12$) and statistically non-significant ($p > 0.05$), indicating the absence of a linear association between these variables in the present sample. This outcome may be attributed to the sociocultural constraints typical of the adult population in contemporary society. Unlike verbal or emotional responses, which may be relatively tolerated in interpersonal contexts, physical aggression is subject to strict regulation by social norms, legal frameworks, and ethical standards. As such, individuals with heightened aggressive tension may suppress physical responses regardless of their level of guilt.

In other words, the absence of physical aggression does not necessarily indicate a low overall level of aggressiveness, but rather the effective suppression of its most socially unacceptable form. That is, even an individual with a low sense of guilt who internally justifies their own aggressive impulses is unlikely to act upon them physically, owing to social control and fear of consequences. This supports the hypothesis of culturally determined selectivity in the expression of aggression, whereby latent, verbal, or symbolic forms are more prevalent than physical manifestations in

socially developed environments. Consequently, the level of guilt primarily regulates the emotional and cognitive aspects of behaviour, while direct physical actions are more strongly influenced by external restraining mechanisms.

DISCUSSION

The results of the empirical study demonstrated the complexity and multidimensionality of the relationship between frustration and aggression, which is fully consistent with contemporary scientific approaches to this issue. The main empirical trend was the predominance of indirect forms of aggression (verbal, indirect, negativism, and irritability) alongside a generally reduced level of physical aggression, indicating the operation of social control mechanisms and the internalisation of social norms. These results align with the principles of the General Aggression Model, which conceptualises aggression as the outcome of the interaction between situational stimuli (notably frustration), personal dispositions (such as anxiety, rigidity, and impulsivity), and cognitive-affective processing of the situation. Comparison of the findings with contemporary scientific literature further enhances understanding of the observed trends. For instance, A. Kruglanski *et al.* (2023) proposed a new integrative concept, framing aggression not only as a reaction to frustration, but also as a means of restoring a sense of personal significance. In this light, the observed high level of fixation on obstacles (OD-type in the S. Rosenzweig method) and increased verbal aggression can be interpreted as compensatory responses by individuals attempting to regain a sense of control and significance in conditions of chronic stress and reduced influence over their environment. Accordingly, aggressive reactions serve a function of restoring psychological agency, in line with A.W. Kruglanski’s model of aggression as a response to perceived threats to significance.

The study by N. Din & M. Ahmad (2021), which highlighted the role of emotional regulation, offers a plausible explanation for the observed low levels of direct aggression in the sample. According to these authors, effective emotional regulation mitigates the effects of frustration, redirecting its expression into socially permissible forms – particularly verbal and indirect aggression. In the context of this study, the notable proportions of indirect aggression (27.2%) and negativism (39.8%) suggest that the respondents have partially developed mechanisms for regulating negative affect. However, where resources for constructive adaptation are lacking, these mechanisms tend to manifest in avoidant or less destructive, albeit still aggressive, forms. Q. Alam (2023) underscored the multifactorial basis of aggressive behaviour, highlighting the interaction of social, cognitive, instinctive, and educational components. This perspective helps reinterpret the elevated levels of emotional instability and anxiety identified using the Eysenck method. When combined with rigidity and insufficient social adaptation (35.1%), emotional instability may form additional cognitive and behavioural barriers to effective responses to frustration. In such contexts, individuals are

less likely to adopt active coping strategies and instead become fixated on the obstructing factors – a cognitive basis for aggressive behaviour.

According to the study's results, frustration emerges not merely as an emotional reaction to obstacles, but as a complex psychophysiological state shaped by personal, cognitive, and social factors. The finding that 29.1% of respondents experience a high level of frustration points to persistent psychological pressure, which, in the absence of adequate adaptation mechanisms, may lead to various forms of destructive behaviour. These data are consistent with the classical frustration–aggression hypothesis formulated by J. Dollard *et al.* (2013) which posited that blocking goal attainment naturally elicits aggression (Van Der Dennen, 2005). Nonetheless, as noted by C. Nickerson (2023) in his review, contemporary psychological science has identified limitations in this theory – especially its neglect of social context, learning processes, and regulatory mechanisms. In particular, the observed reduction in physical aggression (with 67.1% of respondents showing low levels) alongside elevated verbal (26.6%) and indirect aggression (27.2%) highlights the role of self-control and social conformity in curbing impulsive aggression, redirecting it into more acceptable expressions. This supports the view that aggression is not an automatic consequence of frustration, but a product of a complex interplay of emotional, cognitive, and socio-normative influences, as proposed by the General Aggression Model.

Particular attention should be paid to the results obtained using S. Rosenzweig's method (1976), which demonstrated the predominance of externally focused OD-type reactions (39.9%), indicating a cognitive fixation on obstacles without a corresponding orientation towards overcoming them. The observed strong correlation between the OD-type and verbal aggression ($r = 0.68$) supports the assertion that the nature of the cognitive appraisal of a frustrating situation is one of the key determinants of the form aggression takes. This conclusion corresponds with the findings of J. Dugré & S. Potvin (2023), who identified that the transition from frustration to aggression is accompanied by specific patterns of neuronal activation, particularly in the mid-cingulate–insular region. The activation of this area – associated with the processing of negative affect and the motivational salience of stimuli – highlights its critical role in the emergence of impulsive aggressive reactions. Furthermore, the present study also revealed elevated levels of negativism (39.8%) and irritability (33.5%), which, as outlined by Q. Alam (2023), may serve as mediating variables in the development of aggressive behaviour in response to frustration.

In this context, the study confirms the presence of a vicious cycle: frustration induces emotional destabilisation, which in turn reduces levels of social adaptation (reported in 35.1% of the sample), thereby increasing the likelihood of aggression in indirect forms. This is particularly evident in socially mediated behaviours, such as withholding information or exhibiting passive aggression, as discussed

in O.A. Alam's (2023) research, which explored the dynamics of frustration in professional settings. The findings obtained using Rosenzweig's method thus underscore the predominance of externally focused responses (OD-type), reinforcing the tendency to attribute the source of frustration to external circumstances. This observation aligns with L. Berkowitz's cognitive theory, which posits that the interpretation of a frustrating situation plays a decisive role in determining subsequent behavioural responses. The strong correlation between the OD-type and verbal aggression ($r = 0.68$) further reinforces the notion that cognitive fixation on obstacles contributes to the emergence of indirect aggressive forms. The reduction in physical aggression (identified in 67.1% of respondents) alongside elevated levels of verbal (26.6%) and indirect aggression (27.2%) suggests the operation of social control mechanisms that mitigate the likelihood of direct violent behaviour. This transformation of aggressive impulses into more socially acceptable behavioural forms aligns with the General Aggression Model, which emphasises the moderating influence of social context on the frustration–aggression relationship. These findings are also consistent with the study by K. Bertsch *et al.* (2021), which highlighted the role of anger as a specific emotional mediator between frustration and aggression. Their research demonstrated that, in women with borderline personality disorder, frustration elicited anger – a key emotional trigger for aggressive behaviour. Similarly, in the present study, aggression manifested in mediated forms as a response to frustration, underscoring the central role of anger in regulating reactions. However, unlike the clinical sample studied by K. Bertsch *et al.* (2021) the current sample exhibited no evidence of direct aggressive acts, pointing to the effectiveness of self-control and adaptive social strategies among the general adult population.

The study by I. Dewi & M. Kyranides (2022) demonstrated that while anger correlates with all forms of aggression, the expression of specific behavioural patterns is largely determined by individual strategies for managing emotional responses. Notably, their findings indicate that the influence of anger regulation is particularly pronounced in the context of romantic relational aggression. This partially aligns with the current study's findings on indirect aggression, which similarly reflects a socially masked expression of frustration. Consequently, it may be inferred that emotional self-regulation functions as a key buffer between frustration and destructive behaviour, although its effect may vary depending on the situational context. The theoretical model proposed by A. Lankford (2021) extends the conceptual understanding of frustration by incorporating sexual frustration as a distinct form of dissatisfaction that may provoke aggressive behaviour through mechanisms such as revenge, displacement, or assertions of dominance. While the present study did not explore sexual dimensions of frustration, the broader principle – whereby unmet needs are redirected into aggression – is congruent with the observed manifestations of indirect aggression and negativism. Accordingly, A. Lankford's model may

offer valuable directions for future investigations into the specific sources and dynamics of frustration. Equally important are the findings obtained using Eysenck's method, which confirmed emotional instability in a subset of participants, notably elevated levels of anxiety and rigidity. These results correspond with existing literature, where emotional lability is recognised as a factor that heightens vulnerability to frustration and impairs adaptive coping strategies. In such conditions, frustration – rather than serving as a stimulus for constructive mobilisation – may instead manifest through indirect or passive-aggressive behaviours, often complicated by internal conflicts.

The outcomes of this study are largely consistent with the classical frustration-aggression hypothesis advanced by J. Dollard *et al.* (2013), while also illustrating its limitations. As posited in the original theory, goal-blocking frustration evokes aggressive responses; however, empirical evidence shows that such responses are not automatic but are mediated by personal and contextual variables. The refinements introduced by L. Berkowitz, who underscored the role of affective arousal – particularly anger – as a determinant of aggression, are substantiated by the study's findings, especially the notable prevalence of irritability (33.5%) as a common expression of frustration. This suggests that it is not frustration *per se*, but its emotional interpretation and the intensity of affective arousal, that shapes the form of the aggressive reaction. In summary, the findings of the present research support the integrative nature of contemporary theoretical approaches to the frustration-aggression link. Frustration emerges as a critical, though not exclusive, factor in the genesis of aggressive behaviour. Its influence is modulated by cognitive interpretations, emotional regulation capacities, prevailing social norms, and underlying psychological needs – particularly the need for personal significance. These insights underscore the importance of accounting for multifactorial determinants in psychological counselling, violence prevention, and the design of socio-psychological support programmes for the general population.

CONCLUSIONS

Frustration, as a key psychological state, arises when goal attainment is obstructed and may elicit a spectrum of responses – from constructive mobilisation to destructive aggression. Research findings emphasise that the nature of the response (external aggression, self-blame, or focus on the obstacle) is shaped by individual personality traits, cognitive appraisal of the situation, and broader social context. Classical theoretical frameworks, such as J. Dollard's frustration-aggression hypothesis and L. Berkowitz's cognitive

model, alongside contemporary integrative approaches (e.g., the General Aggression Model), suggest that aggression is not an inevitable outcome of frustration. Rather, it is mediated by a combination of emotional (e.g., anger), biological (e.g., impulsivity), and sociocultural (e.g., norms, values, upbringing) influences. Sociocultural factors – including economic instability, media representations, prevailing cultural values, and parenting styles – play a crucial role in modulating both the intensity of frustration and the form of aggressive responses.

The empirical data revealed a substantial level of frustration among respondents, with 29.1% exhibiting a high level – indicative of chronic psychological strain and a potential risk of maladaptive or destructive behaviours. Analysis of frustration reactions using S. Rosenzweig's method showed a predominance of externally focused responses (OD-type, 39.9%), reflecting a cognitive fixation on obstacles rather than adaptive problem-solving. Results from the Bass-Darki method highlighted the transformation of aggressive impulses into more socially sanctioned expressions: while physical aggression was generally low (67.1%), there were notable levels of verbal aggression (26.6%), indirect aggression (27.2%), negativism (39.8%), and irritability (33.5%). The Eysenck test corroborated the presence of emotional instability in a portion of the sample, particularly through elevated levels of anxiety and rigidity.

The findings underscore the multifaceted nature of the link between frustration and aggression. On the one hand, the reduced prevalence of overt physical aggression suggests the effectiveness of both social norms and internal control mechanisms. On the other, the elevated incidence of verbal and indirect aggression points to a redirection of aggressive tendencies into less overt but still potentially harmful behavioural forms. These results validated the need to consider aggression as a socially shaped and internally moderated phenomenon rather than a reflexive outcome of frustration. Future research should aim to expand the sample to include more diverse age, gender, and socio-economic cohorts, and further explore cross-cultural differences in the manifestation of frustration and aggressive behaviour.

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REFERENCES

- [1] Alam, Q.A. (2023). Frustration-aggression: Revisited. *International Journal of Scientific Research in Modern Science and Technology*, 2(12), 48-53. [doi: 10.59828/ijrms.v2i12.168](https://doi.org/10.59828/ijrms.v2i12.168).
- [2] Arif, S., & Al Hassan, S. (2022). Impact of psychological contract breach on employees' sabotage and whistle-blowing behaviors through perceived organizational frustration. *Journal of Development and Social Sciences*, 3(2), 1125-1138. [doi: 10.47205/jdss.2022\(3-II\)100](https://doi.org/10.47205/jdss.2022(3-II)100).

- [3] Asangausung, O.S., Okorie, E.J., & Daniel, U.S. (2025). Paternity disputes and delinquent behaviour among street children in major towns in Akwa Ibom State, Nigeria. *Academic Journal of National Issues*, 2(1), 24-37. doi: [10.5281/zenodo.15049741](https://doi.org/10.5281/zenodo.15049741).
- [4] Bandura, A. (2024). Social learning analysis of aggression. In E. Ribes-Inesta & A. Bandura (Eds.), *Analysis of delinquency and aggression* (pp. 203-232). London: Routledge. doi: [10.4324/9781003487630](https://doi.org/10.4324/9781003487630).
- [5] Bertsch, K., Back, S., Flechsenhar, A., Neukel, C., Krauch, M., Spieß, K., Panizza, A., & Herpertz, S.C. (2021). Don't make me angry: Frustration-induced anger and its link to aggression in women with borderline personality disorder. *Frontiers in Psychiatry*, 12, article number 695062. doi: [10.3389/fpsyt.2021.695062](https://doi.org/10.3389/fpsyt.2021.695062).
- [6] Chitrakar, N., & Nisanth, P.M. (2023). Frustration and its influences on student motivation and academic performance. *International Journal of Scientific Research in Modern Science and Technology*, 2(11), 1-9. doi: [10.59828/ijrmst.v2i11.158](https://doi.org/10.59828/ijrmst.v2i11.158).
- [7] Code of Ethics for Psychologists. (2015, February). Retrieved from <https://nip.nl/wp-content/uploads/2022/09/Code-of-ethics-Beroepscode-NIP-Engels.pdf>.
- [8] Devilly, G.J., O'Donohue, R.P., & Brown, K. (2023). Personality and frustration predict aggression and anger following violent media. *Psychology, Crime & Law*, 29(1), 83-119. doi: [10.1080/1068316X.2021.1999949](https://doi.org/10.1080/1068316X.2021.1999949).
- [9] Dewi, I.D., & Kyranides, M.N. (2022). Physical, verbal, and relational aggression: The role of anger management strategies. *Journal of Aggression, Maltreatment & Trauma*, 31(1), 65-82. doi: [10.1080/10926771.2021.1994495](https://doi.org/10.1080/10926771.2021.1994495).
- [10] Din, N.S., & Ahmad, M. (2021). Emotional regulation on negative affect and aggression: A review. *Asian People Journal*, 4(2), 29-44. doi: [10.37231/apj.2021.4.2.281](https://doi.org/10.37231/apj.2021.4.2.281).
- [11] Dollard, J., Miller, N.E., Doob, L.W., Mowrer, O.H., Sears, R.R., Ford, C.S., & Sollenberger, R.T. (2013). *Frustration and aggression*. London: Routledge. doi: [10.4324/9781315008172](https://doi.org/10.4324/9781315008172).
- [12] Drndarević, N. (2021). Psychological theories of aggression. *Proceedings of the Institute for Criminological and Sociological Investigations*, 40(2-3), 91-104. doi: [10.47152/ziksi202123026](https://doi.org/10.47152/ziksi202123026).
- [13] Dugré, J.R., & Potvin, S. (2023). Neural bases of frustration-aggression theory: A multi-domain meta-analysis of functional neuroimaging studies. *Journal of Affective Disorders*, 331, 64-76. doi: [10.1016/j.jad.2023.03.005](https://doi.org/10.1016/j.jad.2023.03.005).
- [14] Etim, F.O., & Ukpere, W.I. (2023). A deconstruction of frustration-aggression-theory of political violence: Nigeria. *Annals of Spiru Haret University. Economic Series*, 23(2), 117-139. doi: [10.26458/2326](https://doi.org/10.26458/2326).
- [15] Gómez-Leal, R., Megías-Robles, A., Gutiérrez-Cobo, M.J., Cabello, R., & Fernández-Berrocal, P. (2022). Personal risk and protective factors involved in aggressive behavior. *Journal of Interpersonal Violence*, 37(3-4), 1489-1515. doi: [10.1177/0886260520926322](https://doi.org/10.1177/0886260520926322).
- [16] Khadka, C. (2024). Social learning theory and the development of aggression. *Medha: A Multidisciplinary Journal*, 7(1), 79-92. doi: [10.3126/medha.v7i1.73897](https://doi.org/10.3126/medha.v7i1.73897).
- [17] Kruglanski, A.W., Ellenberg, M., Szumowska, E., Molinario, E., Speckhard, A., Leander, N. P., Pierro, A., di Cicco, G., & Bushman, B.J. (2023). Frustration-aggression hypothesis reconsidered: The role of significance quest. *Aggressive Behavior*, 49(5), 445-468. doi: [10.1002/ab.22092](https://doi.org/10.1002/ab.22092).
- [18] Lankford, A. (2021). A sexual frustration theory of aggression, violence, and crime. *Journal of Criminal Justice*, 77, article number 101865. doi: [10.1016/j.jcrimjus.2021.101865](https://doi.org/10.1016/j.jcrimjus.2021.101865).
- [19] Maalouf, E., Salameh, P., Haddad, C., Sacre, H., Hallit, S., & Obeid, S. (2022). Attachment styles and their association with aggression, hostility, and anger in Lebanese adolescents: A national study. *BMC Psychology*, 10(1), article number 104. doi: [10.1186/s40359-022-00813-9](https://doi.org/10.1186/s40359-022-00813-9).
- [20] Mahmood, I., Najam, M., Kamal, M.R., & Ali, A. (2024). Explore how gender influences the expression of aggression in anxious individuals considering socialization and cultural expectation. *Review of Applied Management and Social Sciences*, 7(4), 267-285. doi: [10.47067/ramss.v7i4.376](https://doi.org/10.47067/ramss.v7i4.376).
- [21] Mostova, T.O. (2023). Professional frustration of primary school teachers in conditions of uncertainty: A theoretical and empirical study. In A.V. Halynska (Ed.), *Psychological patterns of social processes and personality development in modern society* (pp. 125-144). Riga: Baltija Publishing. doi: [10.30525/978-9934-26-326-2-8](https://doi.org/10.30525/978-9934-26-326-2-8).
- [22] Navas-Casado, M.L., García-Sancho, E., & Salguero, J.M. (2023). Associations between maladaptive and adaptive emotion regulation strategies and aggressive behavior: A systematic review. *Aggression and Violent Behavior*, 71, article number 101845. doi: [10.1016/j.avb.2023.101845](https://doi.org/10.1016/j.avb.2023.101845).
- [23] Nickerson, C. (2023). *Frustration-aggression hypothesis*. Retrieved from <https://surl.li/naogzg>.
- [24] O'Dea, C.J., Jardin, E., & Saucier, D.A. (2022). [The masculinity-based Model of Aggressive Retaliation in Society \(MARS\)](https://doi.org/10.1002/ab.22092). *Psychology of Men & Masculinities*, 23(2), 160-172.
- [25] Ozuem, W., Ranfagni, S., Willis, M., Salvietti, G., & Howell, K. (2024). Exploring the relationship between chatbots, service failure recovery and customer loyalty: A frustration-aggression perspective. *Psychology & Marketing*, 41(10), 2253-2273. doi: [10.1002/mar.22051](https://doi.org/10.1002/mar.22051).
- [26] Park, D., & Ramirez, G. (2022). Frustration in the classroom: Causes and strategies to help teachers cope productively. *Educational Psychology Review*, 34(4), 1955-1983. doi: [10.1007/s10648-022-09707-z](https://doi.org/10.1007/s10648-022-09707-z).

- [27] Perkel, A. (2023). *Unlocking the nature of human aggression: A psychoanalytic and neuroscientific approach*. London: Taylor & Francis.
- [28] Rahimov, M., Gasimov, S., & Ahmadova, A. (2024). Equal opportunities in education and problems of socialization. *Norwegian Journal of Development of the International Science*, 140, 69-77. doi: [10.5281/zenodo.13788501](https://doi.org/10.5281/zenodo.13788501).
- [29] Rosenzweig, S. (1976). Aggressive behavior and the Rosenzweig picture-frustration (P-F) study. *Journal of Clinical Psychology*, 32(4), 885-891. doi: [10.1002/1097-4679\(197610\)32:4%3C885::aid-jclp2270320434%3E3.0.co;2-r](https://doi.org/10.1002/1097-4679(197610)32:4%3C885::aid-jclp2270320434%3E3.0.co;2-r).
- [30] Saleh, S.A. (2022). Defense mechanisms and personality disorders. In H. Talib Hashim & A. Alexiou (Eds.), *The psychology of consciousness: Theory and practice* (pp. 57-79). Cham: Springer. doi: [10.1007/978-3-030-90692-4_5](https://doi.org/10.1007/978-3-030-90692-4_5).
- [31] Salin, D. (2021). Workplace bullying and culture: Diverse conceptualizations and interpretations. In P. D'Cruz, E. Noronha, C. Caponecchia, J. Escartin, D. Salin & M. Rae Tuckey (Eds.), *Dignity and inclusion at work* (pp. 513-538). Singapore: Springer. doi: [10.1007/978-981-13-0218-3_18](https://doi.org/10.1007/978-981-13-0218-3_18).
- [32] Salman, H.M., & Aleem, D.N. (2024). *Hundred theories and models of mass communication*. doi: [10.2139/ssrn.4790621](https://doi.org/10.2139/ssrn.4790621).
- [33] Savca, L. (2018). *Relationship between behavior aggressive and the of accented character of adolescent*. *Psychological Research International Journal*, 3(4), article number 000162.
- [34] Scheinost, D., et al. (2021). Functional connectivity during frustration: A preliminary study of predictive modeling of irritability in youth. *Neuropsychopharmacology*, 46(7), 1300-1306. doi: [10.1038/s41386-020-00954-8](https://doi.org/10.1038/s41386-020-00954-8).
- [35] Self-Esteem of Mental States (Eysenck). (n.d.). Retrieved from [https://www.armeniamedicalcenter.am/eng/test/13/Self-Esteem-of-Mental-States-\(Eysenck\)](https://www.armeniamedicalcenter.am/eng/test/13/Self-Esteem-of-Mental-States-(Eysenck)).
- [36] Slipetska, V., Ishchenko, Y., Melnychuk, N., Symaka, A., & Makoviichuk, L. (2023). Cultural and historical factors influencing the verbalization of aggression in English journalistic texts: A comparative analysis of modern and historical texts. *Amazonia Investiga*, 12(68), 313-323. doi: [10.34069/AI/2023.68.08.29](https://doi.org/10.34069/AI/2023.68.08.29).
- [37] Stepaniuk, O., & Melnychenko, O. (2020). *Methodological manual for specialists implementing a standard program for offenders*. Kyiv: OSCE.
- [38] Sturme, P. (2022). Psychological and sociological theories of violence and aggression. In P. Sturme (Ed.), *Violence and aggression: Integrating theory, research, and practice* (pp. 215-232). Cham: Springer. doi: [10.1007/978-3-031-04386-4_9](https://doi.org/10.1007/978-3-031-04386-4_9).
- [39] Tordjman, S. (2022). Aggressive behavior: A language to be understood. *L'Encephale*, 48(1), 4-13. doi: [10.1016/j.encep.2022.08.007](https://doi.org/10.1016/j.encep.2022.08.007).
- [40] Toxanbayeva, N., Tokhtarov, A., Naubaeva, K., Orazbekova, D., & Altayeva, G. (2024). The study of the influence of internal and external frustration on the psychological self-defense of a person. *Journal of Psychology & Sociology*, 89(2), 51-60. doi: [10.26577/JPsS.2024.v89.i2.05](https://doi.org/10.26577/JPsS.2024.v89.i2.05).
- [41] Ullah, F., Khan, M., & Zai, R.A. (2021). Freud's theory of human nature and instincts in Chuck Palahniuk's novel Fight Club. *Global Language Review*, 6(2), 130-139. doi: [10.31703/glr.2021\(VI-II\).15](https://doi.org/10.31703/glr.2021(VI-II).15).
- [42] van der Dennen, J.M. (2005). *Frustration and aggression (FA) theory*. Algemeen: Overidge Publications.
- [43] Yuldasheva, M.B., & Ergashova, Z. (2021). Socio-psychological support adolescents with accentuations of character and aggressiveness. *International Journal on Integrated Education*, 4(2), 363-366. doi: [10.31149/ijie.v4i2.1269](https://doi.org/10.31149/ijie.v4i2.1269).

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Емпіричний аналіз кореляції між рівнями фрустрації та формами агресивної поведінки у дорослих

Анотація. Актуальність дослідження зумовлена зростанням проявів агресивної поведінки у дорослих у відповідь на підвищення рівня фрустрації в умовах сучасної соціальної нестабільності. Мета дослідження полягала у встановленні зв'язків між ступенем фрустрації та проявами агресії у дорослих мешканців України. Методологічну основу склали кількісні психодіагностичні методики, зокрема опитувальники, стандартизовані тести та методи статистичної обробки даних. У дослідженні взяли участь 158 осіб (34-53 роки) з різних регіонів України (квітень-червень 2024). Результати показали, що 63,3 % респондентів продемонстрували середній або високий рівень фрустрації, що супроводжувався вираженими агресивними тенденціями. Встановлено статистично значущу позитивну кореляцію між «obstacle-dominance» типом фрустраційних реакцій та рівнями вербальної й непрямой агресії. Найвищий рівень агресії було виявлено серед респондентів із високими показниками тривожності та ригідності, що свідчить про взаємозв'язок між емоційною напругою та схильністю до агресії. Значення шкали почуття провини виявили зворотну залежність від інтенсивності агресивної поведінки, що вказує на її модераційну роль. В окремій підвибірці з 30 осіб спостерігалася сильна позитивна кореляція ($r = 0,68$) між показниками фрустрації та непрямой агресії. У групі з підвищеним рівнем дратівливості спостерігався високий рівень негативізму, що супроводжувався низькими показниками почуття провини. Результати засвідчили наявність комплексного психоемоційного профілю, в якому фрустрація відіграє роль тригера агресії. Висновки підтвердили, що фрустрація є важливим чинником, який істотно впливає на форму та інтенсивність агресивної поведінки. Тип реагування на фрустрацію визначає специфіку прояву агресії. Практична значущість дослідження полягає у можливості розробки психологічних програм профілактики агресії з урахуванням рівня фрустрації та домінуючого типу реагування

Ключові слова: навчальний процес; гейміфікація; критичне мислення; новітні методи; індивідуальні потреби

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