10.22633/rpge.v29iesp2.20658

Revista on line de Política e Gestão Educacional
Online Journal of Policy and Educational Management

INCLUSIVE EDUCATION DURING MARTIAL LAW: CURRENT STRATEGIES AND IMPLEMENTATION EXPERIENCE

EDUCAÇÃO INCLUSIVA DURANTE A LEI MARCIAL: ESTRATÉGIAS ATUAIS E EXPERIÊNCIA DE IMPLEMENTAÇÃO

EDUCACIÓN INCLUSIVA DURANTE LA LEY MARCIAL: ESTRATEGIAS ACTUALES Y EXPERIENCIAS DE IMPLEMENTACIÓN

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How to reference this paper:

Danilavichiutie, E., Arkadieva, O., Trofymenko, L., Andriichuk, T., & Lutsenko, V. (2025). Inclusive education during martial law: current strategies and implementation experience. *Revista on line de Política e Gestão Educacional, 29*(esp2), e025054. https:doi.org/10.22633/rpge.v29iesp2.20658

Submitted: 13/08/2025
Revisions required: 05/09/2025
Approved: 17/11/2025
Published: 25/11/2025

ABSTRACT: This article analyses the effectiveness of inclusive education based on new approaches focused on developing professional skills and providing comprehensive support to students with special educational needs. The methodology combines analysis of existing educational mechanisms, application of the Kirkpatrick model, observation, research, and calculation of the Student's coefficient. The new approaches include the use of the interactive platforms Genially for theoretical study and Jamboard for practical classes, as well as psychological support. The results indicate that inclusive learning is favoured by equality among participants, teamwork, individualization, and multidimensional methods. The experimental group showed better performance (M=87.6; SD=18.1) and greater satisfaction (M=95.3; SD=20.4) than the traditional group (M=75.1; SD=11.8). The overall effectiveness was 85%, demonstrating that these practices make the inclusive process more efficient, flexible, and focused on student needs.

KEYWORDS: Inclusive education. Student equality. Individual approach. Interactive technologies. Tutoring practice.

RESUMO: *O artigo analisa a eficácia da educação inclusiva baseada em novas abordagens voltadas à formação de competências profissionais e ao apoio integral aos alunos com necessidades educacionais especiais. A metodologia combina análise dos mecanismos educacionais existentes, aplicação do modelo Kirkpatrick, observação, pesquisa e cálculo do coeficiente de Student. As novas abordagens incluem o uso das plataformas interativas Genially, para o estudo teórico, e Jamboard, para aulas práticas, além de acompanhamento psicológico. Os resultados indicam que a aprendizagem inclusiva é favorecida pela igualdade entre participantes, trabalho em equipe, individualização e métodos multidimensionais. O grupo experimental apresentou melhor desempenho (M=87,6; SD=18,1) e maior satisfação (M=95,3; SD=20,4) que o grupo tradicional (M=75,1; SD=11,8). A eficácia geral foi de 85%, demonstrando que essas práticas tornam o processo inclusivo mais eficiente, flexível e centrado nas necessidades dos alunos.*

PALAVRAS-CHAVE: *Educação inclusiva. Igualdade dos alunos. Abordagem individual. Tecnologias interativas. Prática de tutoria.*

RESUMEN: *Este artículo analiza la efectividad de la educación inclusiva a partir de nuevos enfoques enfocados al desarrollo de competencias profesionales y al apoyo integral al alumnado con necesidades educativas especiales. La metodología combina el análisis de los mecanismos educativos existentes, la aplicación del modelo de Kirkpatrick, la observación, la investigación y el cálculo del coeficiente de Student. Los nuevos enfoques incluyen el uso de las plataformas interactivas Genially para el estudio teórico y Jamboard para las clases prácticas, así como el apoyo psicológico. Los resultados indican que el aprendizaje inclusivo se ve favorecido por la igualdad entre los participantes, el trabajo en equipo, la individualización y los métodos multidimensionales. El grupo experimental mostró un mejor rendimiento (M=87,6; DE=18,1) y una mayor satisfacción (M=95,3; DE=20,4) que el grupo tradicional (M=75,1; DE=11,8). La efectividad global fue del 85%, lo que demuestra que estas prácticas hacen que el proceso inclusivo sea más eficiente, flexible y centrado en las necesidades del alumnado.*

PALABRAS CLAVE: *Educación inclusiva. Igualdad de los estudiantes. Enfoque individual. Tecnologías interactivas. Práctica de tutoría.*

Article submitted to the similarity system

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INTRODUCTION

Wartime conditions have influenced the transformation of the existing education system, which requires the search for new mechanisms for uninterrupted training of students, considering physical or psychological limitations. Such changes are caused by the need to maintain security, to ensure students' access to the educational process, despite migration processes. However, the most vulnerable category is the inclusive educational environment, as it involves creating an environment with equal conditions for all students, despite special educational needs. Inclusive education should be based on the principles of tolerance and respect, taking into account a personalized approach to each student. Inclusive education should be based on creating a positive educational environment, including interaction with other students and teachers.

During training, it is necessary to ensure a flexible approach that will allow learning both in and out of the classroom. Published studies in recent years have confirmed the effectiveness of organizing an inclusive educational environment with the help of interactive technologies (Nikolopoulou, 2024; Ruiz-Rojas et al., 2023; Yao & Wang, 2024). The use of modern technologies contributes to the principles of inclusive education, focusing on the achievement of high results by students. Most modern research suggests that new approaches and practices of inclusive education should be based on the use of game and interactive forms of learning that contribute to the overall development of students. It is important to involve psychologists who will monitor the psychological state of students.

However, the formation of an inclusive educational environment in wartime has many obstacles (Otych & Orzhel, 2023; Parmigiani et al., 2023). First and foremost, they may be related to security, which cannot guarantee stable access to classes during school hours and requires finding flexible mechanisms for teaching. The feeling of stress among students and teachers has a negative impact on workload and concentration. Barriers to learning may also be related to the lack of equal access to learning tools (e.g., digital technologies), which affects the quality of information perception.

Despite the variety of studies on the need to implement inclusive education, the issues of adapting the latest approaches to the educational process remain insufficiently studied. Particular attention should be paid to the organization of inclusive education during martial law, focusing on specific tools for its implementation to acquire professional skills. More attention should be paid to the practical transformation of inclusive education, which is a separate educational tool.

Based on the analysis of the theoretical features of inclusive education, the purpose of our research is to study the effectiveness of interactive approaches to acquiring professional knowledge in an inclusive educational environment under martial law. The hypothesis of the

study is that the introduction of new approaches and practices in the inclusive educational environment affects the improvement of the quality of the educational process and the achievement of high results by students.

LITERATURE REVIEW

In recent years, research has focused on changing the traditional system of inclusive education, which is caused by professional changes and a focus on overall development. The chosen approaches are aimed at understanding the value of each student, eliminating possible barriers to learning, eliminating student isolation, and ensuring full participation in the educational process. The results of the analysed studies confirm the effectiveness of new teaching strategies for better perception of learning materials by students with disabilities (Almeqdad et al., 2023; Bulathwela et al., 2024; Bong & Chen, 2024; Lindner et al., 2023; Tai et al., 2024).

The need to change the inclusive education system is considered in the studies of Spandagou (2021) and Knight (2025). The author of Spandagou (2021) analyses the need to transform the inclusive educational process in terms of achieving the educational goal. Education should be multi-level, focusing on national and international policies. The results of Knight's (2025) study focus on the need to transform students within inclusive education, which is associated with considering diagnostic criteria and ongoing support. This affects the formation of students' goal-oriented thinking and the achievement of goals.

The need to change the inclusive education system is discussed in the following works: Rapp and Corral-Granados (2021), Walton and Engelbrecht (2022), Qorib (2024b). The authors of Walton and Engelbrecht (2022) consider it necessary to use a comprehensive approach to inclusive education, combining the possibility of studying several subjects. The process involves eliminating inequalities in the learning process, ensuring student motivation by regulating the gradual perception of materials. The study by Rapp and Corral-Granados (2021) focuses on the development of inclusive education based on social development, which involves the formation of a sustainable relationship between all students. This may involve changing the context of education and ensuring constant communication. The study by Qorib (2024b) focuses on the transformation of inclusive education through a differential approach, which involves taking into account the interests of students and providing a flexible learning approach. Learning should include active, creative, innovative forms of student interaction that affect the development of their abilities and professional opportunities.

The study of the peculiarities of inclusive education during martial law is considered in the following studies: Shlenova et al. (2023), Vaintraub (2024), Dor-Haim (2025). Inclusive education during martial law can be implemented through a distance format, which involves the

selection of appropriate interactive tools to preserve the main educational trends (Shlenova et al., 2023). For example, Vaintraub (2024) believes that during the period of martial law, the focus should be on life safety, health, and rules of behaviour in emergency situations. The educational process should be changed to provide moral, emotional, and psychological support, use of information technology, and special needs of students, developing their resilience, courage, and creative thinking. The study by Dor-Haim (2025) states that inclusive education during martial law should provide a high-quality training system. The process should be focused on students' self-realization and participation in social change.

The importance of changing the inclusive approach to education has been studied in the research of Adl-Amini et al. (2024), Massiah et al. (2024), Coy et al. (2025), Suryawan et al. (2025). Massiah et al. (2024) consider the possibility of changing the inclusive education system in terms of theoretical construction, which is associated with an increase in the teaching load. This is due to the need to ensure equal conditions for all students to obtain the required level of professional knowledge. The implementation of inclusive education is possible through the active participation of students in learning and the elimination of possible difficulties in perceiving information.

The importance of inclusive education changes lies in solving difficult learning situations that affect the ability to achieve the interests of students. Learning can be centred on a simulation game that promotes the practical application of skills. Dividing students into groups promotes their active perception of materials and professional development opportunities (Adl-Amini et al., 2024). In inclusive schools, teaching subjects requires a different approach than in regular schools (Suryawan et al., 2025). The educational process should include the integration of "design thinking" that activates students' imagination, senses, and thinking and ensures the development of creativity and independence. Coy et al. (2025) note that students' potential in inclusive education can be developed through constant communication. However, the process should consider cultural and linguistic aspects and provide quality feedback that influences students' interest.

A separate group of studies is aimed at determining the need to ensure an inclusive approach to learning through interactive technologies (Almufareh et al., 2024; Muhammad & Yahaya, 2025; Navas-Bonilla et al., 2025; Toto et al., 2024). The authors of Toto et al. (2024) believe that the use of modern technologies ensures the personalization of inclusive education and affects the creation of a quality curriculum through elements of gamification, development of student motivation.

The potential of modern technologies is associated with the possibility of creating equal educational environments for students to achieve positive results. Digital technologies help to remove barriers to learning (Navas-Bonilla et al., 2025). This is due to the ability to adapt to the needs of students and enable collaboration between students, providing academic

preparation and social integration to unlock students' potential (Navas-Bonilla et al., 2025). Almufareh et al. (2024) note that artificial intelligence is bringing about positive changes in inclusive education.

Assistive technologies affect the ability to recognize voice, create virtual tours, and monitor important health criteria. The process relates to the possibility of adapting to the learning style, ensuring a balance between the educational approach and compliance with ethical criteria. Similar findings are presented in Muhammad and Yahaya (2025). The authors provide the opportunity to overcome barriers to learning, provide individual tutoring and flexible learning approaches. This affects the choice of the required pace of learning and the students' ability to realize their own potential.

The analysis of scientific papers has shown the importance of changing inclusive education for students' professional development. It affects the ability to provide new strategies in teaching and the overall development of students. However, there are gaps in the creation of effective methods for transforming inclusive education, which is associated with the choice of not only individual mechanisms, but also the possibility of their adaptation to the academic process to achieve the necessary results.

RESEARCH METHODS

The study was conducted in February-April 2025 with the involvement of students. The study involved 58 2nd year students majoring in pedagogy, philology, and management who had limited educational opportunities, namely locomotor disorders (partial paralysis, minor spinal cord injuries) or speech disorders (stuttering, dyslexia). In accordance with the research program, students were divided into two groups, namely the control group (n=29, the training was conducted using the traditional approach) and the experimental group (n=29, the educational process was implemented using the latest approaches and practices).

The tools for the practical implementation of the educational process for students of the experimental group were the Genially and Jamboard platforms, which is associated with the use of interactive educational materials, performing simulation tasks, such as brainstorming. The learning mechanisms were developed based on the analysis of the features of inclusive education and existing learning strategies (Alshammari & Alkhwaldi, 2025; Chow et al., 2024; Iacono et al., 2023; Jackson et al., 2025; Ketikidou & Saiti, 2025; Makoelle & Burmistrova, 2021; Marsili et al., 2025; Migliarini & Elder, 2024).

Students in the control group continued their studies according to the traditional system, which involved the use of materials approved by the curriculum without using additional interactive tools to understand lecture materials and conduct practical classes. Comparison of

the results of students in the control and experimental groups was necessary to determine the effectiveness of new approaches and practices compared to the traditional system of education.

Determining the level of effectiveness of the educational process was achieved using the Kirpatrick model (Anderson & Merkebu, 2024), which included the criteria of student response to the educational process, quality of the educational process, student behaviour, and performance. The information necessary for the study was collected through teacher and tutor observation of students and a survey among students. Appendix A presents the questions used to conduct the survey among students. The effectiveness of the students' results and the quality of the learning tools used were assessed using a 100-point scale. If students achieved the academic outcomes (theoretical and practical knowledge), they could receive 90 to 100 points.

This included understanding of the subject, fluency in information for analysis, ability to complete project tasks, and development of independence. Minor mistakes and gaps in knowledge included scores from 75 to 90 (availability of skills to solve tasks, the possibility of making up to 3 mistakes, but with the preservation of general logic), lack of approaches to understanding the knowledge gained by students—from 60 to 74 points (solving educational tasks, but with significant errors (more than 3) based on mechanical actions rather than a meaningful approach). If students could not solve the tasks, the results were below 60 points. Information was collected using a Google Form. The statistical confirmation of the results was carried out using the Student's coefficient (Field, 2018).

$$t = \frac{M_1 - M_2}{\sqrt{m_1^2 + m_2^2}} \qquad (1)$$

M_1, M_2 - average values of indicators;
m_1^2, m_2^2 - the square of the standard deviation of comparative indicators.

RESEARCH RESULTS

Higher education institutions are transitioning inclusive education from a traditional to an interactive format. The qualitative perception of materials depends not only on the individual teaching approach, but also on the combination of other factors. A significant number of scientific studies have identified the need for teachers to continuously improve their skills, focusing on the needs of students (Chow et al., 2024; Lin & Chen, 2024; Mendoza & Heymann, 2024; Pradhan & Naik, 2024).

First, this implies the need to develop pedagogical skills related to the transformation of curricula. Teachers also need to focus on changing the way information is presented, which contributes to better visual perception and highlighting the most important information. Teacher training should also be based on the development of psychology skills that will allow them to support students, show compassion and manage their own emotions. Attention should be paid to the development of a high level of communication skills and opportunities for professional development. Developing such skills by teachers is necessary to create a comfortable learning environment based on the principles of tolerance and the development of students' overall potential.

The use of specialized training approaches should be based on a comprehensive approach that affects the quality of the organization (Alshammari & Alkhwaldi, 2025; Jackson et al., 2025; Ketikidou & Saiti, 2025; Marsili et al., 2025). First and foremost, attention should be paid to the accessibility of learning, which includes the provision of the necessary learning materials in print, electronic form or audio recordings. It is also necessary to ensure that students have special learning applications to study theoretical material or improve practical skills. The use of interactive technologies can help students with disabilities to select an individual learning mechanism within the general curriculum.

Such an approach is associated with eliminating gaps in practical or theoretical knowledge through additional study of materials, choosing interactive exercises to correct knowledge. Adaptation to the perception of information using digital technologies may vary depending on the complexity of the topic and the need for ways of presenting information (text, graphic, sound approach). This may include the use of Edmodo, Moodle, etc. Interactive technologies affect the ability to provide feedback through tactile technologies or speech synthesizers. Thus, it is possible to correct mistakes immediately and increase student motivation. The advantages of interactive technologies in inclusive education are related to motivation and the possibility of self-development.

One of the main positive effects on inclusive education is the use of a multidimensional approach (Frohn, 2025; Swaminathan et al., 2025). This approach involves considering pedagogical, psychological, and social factors in teaching. It helps to maintain multifactoriality in the educational process, to comprehensively consider the topic, taking into account the individuality of students. A multidimensional approach allows for better solutions to complex pedagogical situations and ensures communication between all students and teachers. It affects the ability to provide flexible learning by enhancing the interaction between all components of the learning process and the ability to take into account interdisciplinary interaction.

Based on this, current research is aimed at implementing inclusive education through digital technologies. This ensures the acquisition of not only professional skills, but also general development, the ability to analyse professional situations. Interactive technologies help

to consider the individual needs of students and make information easier to understand. Also, the combination of the educational process with modern technological capabilities affects the accessibility of learning and the use of a multidimensional approach that ensures multifactorial learning.

The analysis confirms the need to ensure the complexity of the organization of the inclusive educational process, which is associated with the formation of accessible learning. Inclusive education should be aimed at creating equal conditions for all students, which contributes to their professional and general development. In Table 1, the authors highlight the general educational features of inclusive education that contribute to its effectiveness.

Table 1
General educational features of inclusive education that affect the improvement of the quality of the educational process

Component of inclusive education	**Features of the analysed component**	**Specificity of implementation**
Equality of all participants in the educational process	*Provides for the availability of materials and technological tools for learning*	*Combination of audio, video and textual approaches in the presentation of information*
Individual approach to learning	Provides for the consideration of problematic topics in the study for each student	Integration of new methods for perception of materials, selection of additional exercises for better assimilation of information
Team interaction	Involves interaction between students and teachers, psychologists, social workers	Work on creating educational projects
A non-standard approach to presenting information	Involves the use of interactive technologies	Organization of training through visualization, gamification, specialized platforms
A multidimensional approach	Focused on choosing a comprehensive approach to training	Organizing learning through a combination of different learning strategies to achieve professional skills and overall development

Note. Developed by the authors based on materials (Alshammari & Alkhwaldi, 2025; Chow et al., 2024; Frohn, 2025; Jackson et al., 2025; Ketikidou & Saiti, 2025; Lin & Chen, 2024; Mendoza & Heymann, 2024; Marsili et al., 2025; Pradhan & Naik, 2024; Swaminathan et al., 2025).

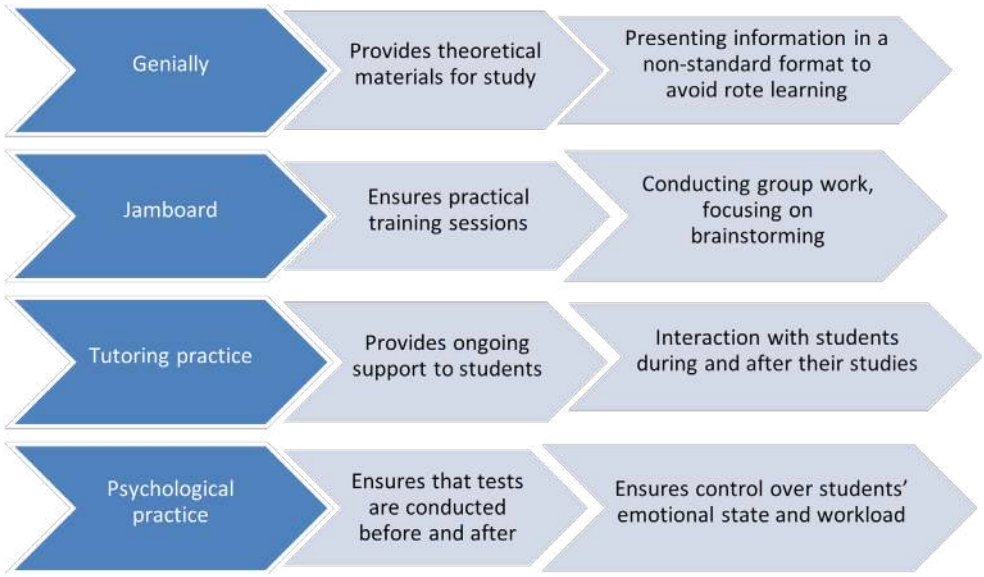
Based on the analysis of Table 1, it is possible to determine that the use of non-standard educational tools and a multidimensional approach provides an opportunity to transform the educational process. The use of interactive technologies allows to change the traditional approach to inclusive learning and ensure its flexibility and the possibility of finding new tools for learning materials. The application of an integrated approach to learning affects holistic learning to achieve better results.

However, the effectiveness of the learning process is directly related to the choice of specific tools that will help improve students' knowledge and motivation. Figure 1 shows the

tools that ensure the implementation of inclusive learning mechanisms. The choice of tools is focused on the application of new approaches and practices that contribute to changing traditional teaching and achieving high results. To obtain experimental results, the authors proposed to adapt the tools to inclusive education, which are shown in Figure 1.

Figure 1

Features of the application of the latest approaches and practices in inclusive education in the study



Note. Developed by the authors on the basis of materials (Alshammari & Alkhwaldi, 2025; Chow et al., 2024; Iacono et al., 2023; Jackson et al., 2025; Ketikidou & Saiti, 2025; Makoelle & Burmistrova, 2021; Marsili et al., 2025; Migliarini & Elder, 2024).

The training took place among 2nd year students at. The duration of the training was 3 months from February 2025 to April 2025. The educational process involved a combination of classroom (40%) and distance learning (60%).

The use of the interactive platform Genially made it possible to diversify the ways of perceiving lecture materials. The platform provided for the creation of not only presentations, but also the use of infographics and quizzes. This facilitated the visual perception of information, which was due to the possibility of using animation, hyperlinks, virtual tours, etc. The use of Genially influenced the ability to perceive materials in text format (using text, graphs, diagrams, etc.), through audio (based on synthesizing the teacher's voice or uploading audio recordings) and video (based on uploading videos or using them from available resources such as YouTube, Vimeo).

The Jamboard platform provides an opportunity to conduct practical classes. The process involved interaction with the practical materials of the group of students, which was focused on the development of communication skills. The process of using the platform is associated with brainstorming, which is aimed at expanding students' professional knowledge

through active interaction. Brainstorming involved searching for information and approaches to solving a problem, creating presentations based on the topic studied.

The use of tutoring practice was focused on creating continuous support for students with disabilities by senior students to ensure orientation in the learning environment. Such interaction was aimed not only at coordinating the learning process but also at motivating students. The approach facilitated the choice of learning style, time planning, and support during study. The tutor helped students understand how to use interactive platforms to study materials.

The educational process included systematic psychological tests for students. The tests were conducted before and after classes to determine the emotional state and level of overwork. This allowed us to control the learning process and the level of students' perception of the materials. This approach helps to detect burnout or increased anxiety in students in a timely manner and ensures a comfortable approach to learning by eliminating overload.

The inclusion of such tools in the educational process became the basis for the transformation of the inclusive education system, which ensured its use for the experimental group of students. Students in the control group were taught using the traditional approach, which excluded the focus on individual skills of each student and the use of specialized interactive applications.

The training was conducted using the Zoom platform. The study involved 58 students of various specializations (pedagogy, philology, management) who had locomotor disorders (partial paralysis, spinal cord injuries, etc.) or speech disorders (dyslexia, stuttering). The students were divided into two equal groups of 29 people, which allowed us to assess the level of knowledge they received based on the use of different teaching approaches. The assessment of the effectiveness of the learning process was conducted using the Kirpatrick model (Anderson & Merkebu, 2024). According to the Kirpatrick model, the assessment included:

- Students' perception of the educational process based on the "reaction" criterion;
- Quality of the educational process according to students using the criterion of "learning";
- Students' behaviour in the learning process using the "behaviour" criterion;
- Assessment of the level of knowledge gained by students using the "Results" criterion.

To obtain information on the "reaction" and "behaviour" criteria, tutors were involved who constantly interacted with students and could assess their attitude to the learning process. Of course, the process included receiving feedback with confirmation of the data obtained through observation. The quality of the learning process was assessed directly by students, which included receiving written information from students using Google Forms. The information included an assessment of the quality of the educational process, including

the organization of the course, availability of necessary teaching tools, quality of information presentation, consideration of students' needs, and availability of feedback. When providing answers, students substantiated their opinions with examples from the learning process. Overall student performance was assessed with the help of professors who focused on the students' knowledge and skills before and after the survey. A 100-point scale was used to assign points. Additionally, the results were statistically tested using Student's coefficient (Field, 2018). The results are presented in Table 2.

Table 2
Effectiveness of inclusive education based on the Kirpatrick methodology

Analysis criteria	Control group						Experimental group					
	Before the study		After the study		t-test (table value: 2.132)	p-value	Before the study		After the study		t-test (table value: 2.132)	p-value
	M	SD	M	SD			M	SD	M	SD		
Reaction	62,1	10,4	78,5	12,6	2,015	0,05	63,5	10,5	95,3	20,4	2,238	0,02
Education	65,8	11,2	74,1	11,5	1,974	0,05	64,1	10,8	95,1	20,2	2,225	0,02
Behaviour	75,4	11,9	79,3	12,9	1,812	0,05	75,1	11,8	96,3	19,7	2,146	0,03
Results	71,7	11,5	75,1	11,8	1,803	0,05	71,5	11,3	87,6	18,1	2,153	0,03

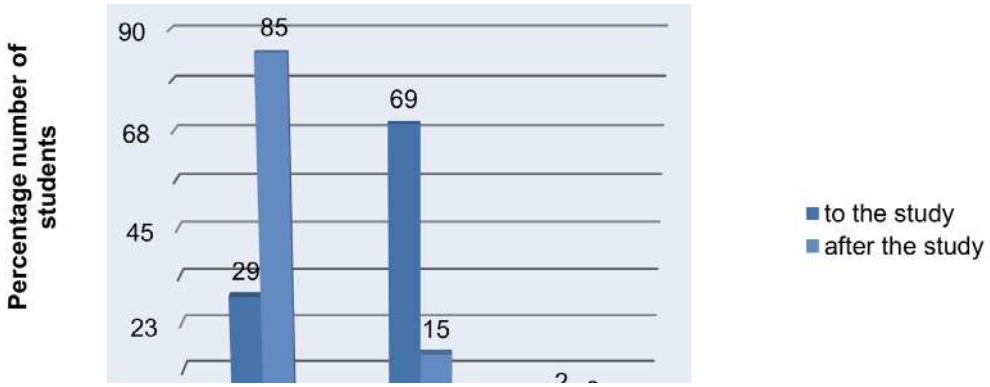
Note. Developed by the authors.

The evaluation of the effectiveness of the educational process and the results obtained by students showed the advantages of new approaches in an inclusive educational environment. Students in the experimental group were able to achieve better results due to individualized study of topics and tutor support. Statistical comparison of indicators from the Kirpatrick model showed that the reaction of students in the experimental group to the learning process was more positive, due to the variety of tools used, considering the psychological state and workload of students (M=95.3; SD=20.4). This made it possible to motivate students to study, develop independence skills for the formation of professional competence. Students in the control group achieved lower results due to the lack of workload distribution and consideration of individual needs to consolidate learning materials (M=78.5; SD=12.6).

The study also included an assessment of the effectiveness of the selected learning tools by students (Figure 2). The process involved conducting a survey among the students of the experimental group based on the questions presented in Appendix A. To evaluate each question of the questionnaire, students used a 3-point scale, which provided for 3 points if students agreed with the high positive value of the criterion described in the question. A score of 2 points was given if there was an average positive impact; 1 point—no positive impact.

Therefore, high effectiveness of the educational process was assessed if the average values were at the level of 2.5—3 points; medium effectiveness—1.5—2.4 points; low effectiveness—below 1.4 points. The survey involved the use of Google Forms. The results obtained from students were tested for reliability using Cronbach's alpha. This approach involved comparing the information from teachers, which was obtained by observing students throughout the study period, and the answers provided by students. The calculated value of Cronbach's alpha is 0.79, which confirms the reliability of the answers based on exceeding the minimum standard value of 0.7. A summary table of the obtained survey values and correlation results are presented in Appendix B (Tables B1-B4).

Figure 2
Features of students' perception of the educational process before and after the study



Note. Developed by the authors.

The results of the study showed that students in the experimental group (85% of students) confirmed the effectiveness of using new approaches and practices in the learning process (Genially and Jamboard platforms, tutoring practice, psychological tests). The advantages of new approaches to learning are related to the consideration of the individual pace of learning for each student using interactive technologies. Considering the psychological state of students motivated them to improve their professional knowledge and better assimilate materials. The training was also focused on the development of social skills, which contributed to their free behaviour in the learning environment.

DISCUSSION

The study results confirmed the hypothesis that new approaches to inclusive education are effective in martial law. The use of the Kirpatrick model made it possible to identify the benefits of the approaches and practices used (interactive platforms Genially, Jamboard, tutoring practice and psychological support) for obtaining positive student reactions (M=95.3;

SD=20.4) and achieving high results (M=87.6; SD=18.1). The effectiveness of implementing new teaching strategies was also confirmed in the study by Matjanov (2024). The author notes that the combination of psychological and pedagogical teaching strategies contributes to the creation of new opportunities and conditions for learning. Similar results are confirmed by Qorib (2024a), who notes that the use of blended inclusive learning approaches affects the development of students' critical thinking and professional literacy. The results of our work confirm the possibility of achieving high results and increasing self-confidence through constant communication.

The results of our work on the need to ensure an individualized approach in inclusive education are like the findings of Zhang and Zhang (2024), who note the improvement of interaction between teacher and student through the active use of learning strategies. The approach affects the ability to better manage the learning environment, making it accessible through digital technologies. Similar results were obtained by Travers and Downes (2025), who emphasize that the presence of mediation in inclusive education affects the interaction between all participants and influences the development of critical thinking. On the contrary, Jardinez and Natividad (2024) state that students with disabilities should be integrated into regular classes. This will facilitate their better adaptation to the learning environment, reduce the gap between all students, and ensure their overall development.

Instead, Daniel et al. (2024) believe that developing students' motivation in inclusive education is more important than an individualized approach. Such results are related to the possibility of developing students' potential by developing academic and personal skills. The results of our work were also related to the development of students' motivation in the learning process, but it was formed under the influence of an integrated learning approach. The formation of students' motivation was associated with the use of interactive platforms (Genially, Jamboard), tutoring practice and a psychological approach.

According to Vistorte et al. (2024), an integrated approach is not an effective tool for inclusive learning, as better results can be achieved using artificial intelligence. Artificial intelligence provides a change in pedagogical strategies, influences the creation of an adaptive learning environment, and provides emotion recognition for students to change the learning process and reduce the workload of students. However, the use of digital technologies alone does not contribute to the formation of quality inclusive education (Mohebi, 2024). One of the problems is the lack of strategies for effective content creation (25%) and the complexity of pedagogical integration (31.25%). Therefore, the use of a combined approach allows to achieve high learning efficiency. In their turn, AlAli and Wardat (2024), El Naggar et al. (2024) and Sultan (2025) note the need to use interactive technologies in the educational process, which affects the formation of intellectually stimulating experience, which helps to solve learning problems and create a well-thought-out learning system.

Thus, the use of the latest mechanisms for the formation of inclusive education ensures a focus on individual student capabilities and the achievement of professional development. However, the effectiveness of this approach depends on the quality of integration of teaching mechanisms and the possibility of their adaptation to a particular group of students, depending on the presence of physical or psychological limitations. Further research should focus on extending the time students spend learning using the chosen methodology to test its effectiveness in the long term.

CONCLUSION

The results of the study have shown that the use of new approaches and practices contributes to the improvement of an inclusive educational environment, which not only provides an individualized approach to learning but also motivates students to acquire professional skills. The novelty of the study lies in the proven effectiveness of implementing an integrated approach to inclusive education, which involves a combination of interactive platforms Genially, Jamboard, tutoring practice and psychological support.

The practical implementation of the used educational approaches has shown a positive perception of the educational process by students, improvement of its quality, improvement of student behaviour, and overall performance. It also influenced students' confirmation of the selected learning tools, which is associated with the development of professional and social skills by students.

The limitations of the study are related to the lack of involvement of students of all courses in the implementation of training, which was due to the limited time frame and insufficient number of training tools before the research program was expanded to include respondents. However, the results showed the advantages of the developed inclusive learning compared to the traditional system, which can be adapted for students of other courses. Promising areas of research may be focused on considering the specifics of each subject of professional training to select appropriate interactive technologies for improving professional knowledge, which will help to take into account professional, psychological, and emotional factors. In addition, the educational process should adhere to ethical standards, which will ensure the equality of students with disabilities and the formation of professional knowledge in accordance with the specified specialization.

REFERENCES

Adl-Amini, K., Meßner, M. T., & Hardy, I. (2024). A simulation game for placement decision-making: fostering reflection and belief change about inclusion in teacher education. *International Journal of Inclusive Education, 29*(7), 1197–1213. https://doi.org/10.1080/13603116.2024.2319095

AlAli, R., & Wardat, Y. (2024). Opportunities and challenges of integrating generative artificial intelligence in education. *International Journal of Religion, 5*(7), 784–793. https://doi.org/10.61707/8y29gv34

Almeqdad, Q. I., Alodat, A. M., Alquraan, M. F., Mohaidat, M. A., & Al-Makhzoomy, A. K. (2023). The effectiveness of universal design for learning: A systematic review of the literature and meta-analysis. *Cogent Education, 10*(1), 2218191. https://doi.org/10.1080/2331186X.2023.2218191

Almufareh, M. F., Kausar, S., Humayun, M., & Tehsin, S. (2024). A conceptual model for inclusive technology: Advancing disability inclusion through artificial intelligence. *Journal of Disability Research, 3*(1), 20230060. https://doi.org/10.57197/JDR-2023-0060

Alshammari, S. H., & Alkhwaldi, A. F. (2025). An integrated approach using social support theory and technology acceptance model to investigate the sustainable use of digital learning technologies. *Scientific Reports, 15*(1), 342. https://doi.org/10.1038/s41598-024-83450-z

Anderson, L., & Merkebu, J. (2024). The Kirkpatrick model: A tool for evaluating educational research. *Family Medicine, 56*(6), 403. https://doi.org/10.22454/FamMed.2024.161519

Bong, W. K., & Chen, W. (2024). Increasing faculty's competence in digital accessibility for inclusive education: A systematic literature review. *International Journal of Inclusive Education, 28*(2), 197–213. https://doi.org/10.1080/13603116.2021.1937344

Bulathwela, S., Pérez-Ortiz, M., Holloway, C., Cukurova, M., & Shawe-Taylor, J. (2024). Artificial intelligence alone will not democratise education: On educational inequality, techno-solutionism and inclusive tools. *Sustainability, 16*(2), 781. https://doi.org/10.3390/su16020781

Chow, W. S. E., de Bruin, K., & Sharma, U. (2024). A scoping review of perceived support needs of teachers for implementing inclusive education. *International Journal of Inclusive Education, 28*(13), 3321–3340. https://doi.org/10.1080/13603116.2023.2244956

Coy, A., Mohammed, P. S., & Skerrit, P. (2025). Inclusive deaf education enabled by artificial intelligence: The path to a solution. *International Journal of Artificial Intelligence in Education, 35*(1), 96–134. https://doi.org/10.1007/s40593-024-00419-9

Daniel, K., Msambwa, M. M., Antony, F., & Wan, X. (2024). Motivate students for better academic achievement: A systematic review of blended innovative teaching and its

impact on learning. *Computer Applications in Engineering Education, 32*(4), e22733. https://doi.org/10.1002/cae.22733

Dor-Haim, P. (2025). Understanding self-fulfillment: Principals' perspectives in special education for complex disabilities. *Journal of Educational Administration, 63*(1), 34–47. https://doi.org/10.1108/JEA-06-2024-0178

El Naggar, A., Gaad, E., & Inocencio, S. A. M. (2024). Enhancing inclusive education in the UAE: Integrating AI for diverse learning needs. *Research in Developmental Disabilities, 147*, 104685. https://doi.org/10.1016/j.ridd.2024.104685

Field, A. (2018). *Discovering statistics using IBM SPSS statistics* (5ª ed.). SAGE Publications.

Frohn, J. (2025). Modelling inclusive education. The Didactic Model for Inclusive Teaching and Learning as a heuristic for inclusion research and teacher education. *Journal of Research in Special Educational Needs, 25*(3), 514–526. https://doi.org/10.1111/1471-3802.12741

Iacono, T., Landry, O., Garcia-Melgar, A., Spong, J., Hyett, N., Bagley, K., & McKinstry, C. (2023). A systematized review of co-teaching efficacy in enhancing inclusive education for students with disability. *International Journal of Inclusive Education, 27*(13), 1454–1468. https://doi.org/10.1080/13603116.2021.1900423

Jackson, D., Dean, B. A., & Eady, M. (2025). Equity and inclusion in work-integrated learning: Participation and outcomes for diverse student groups. *Educational Review, 77*(2), 329–350. https://doi.org/10.1080/00131911.2023.2182764

Jardinez, M. J., & Natividad, L. R. (2024). The Advantages and Challenges of Inclusive Education: Striving for Equity in the Classroom. *Shanlax International Journal of Education, 12*(2), 57–65. https://doi.org/10.34293/education.v12i2.7182

Ketikidou, G., & Saiti, A. (2025). The promotion of inclusive education through sustainable and systemic leadership. *International Journal of Leadership in Education, 28*(3), 639–654. https://doi.org/10.1080/13603124.2022.2032368

Knight, C. (2025). Dyslexia: Identity, labelling and its place in inclusive education. *British Journal of Special Education, 52*(2), 251–257. https://doi.org/10.1111/1467-8578.70028

Lin, H., & Chen, Q. (2024). Artificial intelligence (AI)-integrated educational applications and college students' creativity and academic emotions: Students and teachers' perceptions and attitudes. *BMC Psychology, 12*(1), 487. https://doi.org/10.1186/s40359-024-01979-0

Lindner, K. T., Schwab, S., Emara, M., & Avramidis, E. (2023). Do teachers favor the inclusion of all students? A systematic review of primary schoolteachers' attitudes towards inclusive education. *European Journal of Special Needs Education, 38*(6), 766–787. https://doi.org/10.1080/08856257.2023.2172894

Makoelle, T. M., & Burmistrova, V. (2021). Teacher education and inclusive education in Kazakhstan. *International Journal of Inclusive Education, 29*(4), 447–463. https://doi.org/10.1080/13603116.2021.1889048

Marsili, F., Dell'Anna, S., & Pellegrini, M. (2025). Giftedness in inclusive education: a systematic review of research. *International Journal of Inclusive Education, 29*(4), 502–519. https://doi.org/10.1080/13603116.2023.2190330

Massiah, A., Shotte, G., Rowe, V., & Minott, C. (2024). Educational leadership for social transformation: An inclusive approach for schools as places of belonging. *Power and Education, 17*(2), 142–158. https://doi.org/10.1177/17577438241297239

Matjanov, A. J. (2024). Use of pedagogical methods based on the modern educational program to increase the effectiveness of education. *European International Journal of Pedagogics, 4(*6), 26–33. https://doi.org/10.55640/eijp-04-06-06

Mendoza, M., & Heymann, J. (2024). Implementation of inclusive education: A systematic review of studies of inclusive education interventions in low-and lower-middle-income countries. *International Journal of Disability, Development and Education, 71*(3), 299–316. https://doi.org/10.1080/1034912X.2022.2095359

Migliarini, V., & Elder, B. C. (2024). The future of inclusive education. In *The future of inclusive education: Intersectional perspectives* (pp. 1-21). Springer Nature. https://doi.org/10.1007/978-3-031-49242-6_1

Mohebi, L. (2024). Empowering learners with ChatGPT: Insights from a systematic literature exploration. *Discover Education, 3*(1), 36. https://doi.org/10.1007/s44217-024-00120-y

Muhammad, Y., & Yahaya, W. A. J. W. (2025). Breaking barriers to equitable education for sustainable future: Creating inclusive learning opportunities in higher education through ai innovations. In *A Practical Guide to Artificial Intelligence in Higher Education: Innovation and Applications* (pp. 57–64). Springer Nature. https://doi.org/10.1007/978-3-031-56848-0_7

Navas-Bonilla, C. D. R., Guerra-Arango, J. A., Oviedo-Guado, D. A., & Murillo-Noriega, D. E. (2025). Inclusive education through technology: A systematic review of types, tools and characteristics. *Frontiers in Education, 10*, 1527851. https://doi.org/10.3389/feduc.2025.1527851

Nikolopoulou, K. (2024). Generative artificial intelligence in higher education: Exploring ways of harnessing pedagogical practices with the assistance of ChatGPT. *International Journal of Changes in Education, 1*(2), 103–111. https://doi.org/10.47852/bonviewIJCE42022489

Otych, O., & Orzhel, O. (2023). Inclusion in higher education under wartime: National level of regulation and strategic development goals. *Problems of Education, 2*(99), 60–71. https://doi.org/10.52256/2710-3986.2-99.2023.04

Parmigiani, D., Spulber, D., Ambrosini, A., Molinari, A., Nicchia, E., Pario, M., Pedevilla, A., Sardi, I., & Silvaggio, C. (2023). Educational strategies to support the inclusion of displaced pupils from Ukraine in Italian schools. *International Journal of Educational Research Open, 4*, 100255. https://doi.org/10.1016/j.ijedro.2023.100255

Pradhan, K. C., & Naik, M. S. (2024). Inclusive education: A foundation for equality and empowerment at the elementary stage. *International Journal of Multidisciplinary Research in Arts, Science and Technology, 2*(2), 1–8. https://doi.org/10.61778/ijmrast.v2i2.36

Qorib, M. (2024a). Analysis the impact of differentiated instruction on critical diversity literacy in inclusive education. *Aksaqila International Humanities and Social Sciences Journal, 3*(1), 1–19. https://doi.org/10.30596/aihss.v3i1.502

Qorib, M. (2024b). Analysis of differentiated instruction as a learning solution in student diversity in inclusive and moderate education. *International Journal Reglement & Society (IJRS), 5*(1), 43–55. https://jurnal.bundamediagrup.co.id/index.php/ijrs/article/view/452

Rapp, A. C., & Corral-Granados, A. (2021). Understanding inclusive education: A theoretical contribution from system theory and the constructionist perspective. *International Journal of Inclusive Education, 28*(4), 423–439. https://doi.org/10.1080/13603116.2021.1946725

Ruiz-Rojas, L. I., Acosta-Vargas, P., De-Moreta-Llovet, J., & Gonzalez-Rodriguez, M. (2023). Empowering education with generative artificial intelligence tools: Approach with an instructional design matrix. *Sustainability, 15*(15), 11524. https://doi.org/10.3390/su151511524

Shlenova, M., Konoplenko, N., Yuryeva, K., Korneiko, Y., & Hlukhovska, M. (2023). Comparative analysis of the distance learning implementation in Ukrainian system of higher education during the COVID-19 pandemic and martial law. *Interactive Learning Environments, 32*(9), 4968–4977. https://doi.org/10.1080/10494820.2023.2207196

Spandagou, I. (2021). Inclusive education is another country: Developments, obstacles and resistance to inclusive education. *International Journal of Inclusive Education, 29*(1), 17–31. https://doi.org/10.1080/13603116.2021.1965805

Sultan, Y. (2025). Psychological factors influencing the acceptance of AI tools among teachers and students in inclusive classroom. *Review of Applied Management and Social Sciences, 8*(2), 897–913. https://doi.org/10.47067/ramss.v8i2.524

Suryawan, I. P. P., Pujawan, I. G. N., Mahayukti, G. A., Sudiarta, I. G. P., & Suharta, I. G. P. (2025). Vocational teachers' creativity and independence in developing inclusive mathematics learning evaluation integrated with design for change. *International Journal of Environmental Sciences, 11*(4), 548–563. https://theaspd.com/index.php

Swaminathan, J., Kavitha, K. R., Sibin, B., Raman, R., & Nedungadi, P. (2025). A multi-aspect visualization framework for advancing STEM pedagogy and SDG4: Digital India's Computer Science OLabs. *SN Computer Science, 6*(3), 284. https://doi.org/10.1007/s42979-025-03735-6

Tai, J., Ajjawi, R., & Umarova, A. (2024). How do students experience inclusive assessment? A critical review of contemporary literature. *International Journal of Inclusive Education, 28*(9), 1936–1953. https://doi.org/10.1080/13603116.2021.2011441

Toto, G. A., Marinelli, C. V., Cavioni, V., di Furia, M., Traetta, L., Iuso, S., & Petito, A. (2024). What is the role of Technologies for Inclusive Education? A systematic review. In *International Conference on Higher Education Learning Methodologies and Technologies Online* (pp. 533–565). Springer. https://doi.org/10.1007/978-3-031-67351-1_36

Travers, J., & Downes, P. (2025). Developing a concentric spatial turn for inclusive and special education: Key issues for systems development. *European Journal of Special Needs Education*, 1–26. https://doi.org/10.1080/08856257.2025.2529010

Vaintraub, M. (2024). Professional Competence Development of Teaching Staff in Higher Education Institutions under Martial Law. *Educational Challenges, 29*(1), 204–213. https://doi.org/10.34142/2709-7986.2024.29.1.14

Vistorte, A. O. R., Deroncele-Acosta, A., Ayala, J. L. M., Barrasa, A., López-Granero, C., & Martí-González, M. (2024). Integrating artificial intelligence to assess emotions in learning environments: A systematic literature review. *Frontiers in Psychology, 15*, 1387089. https://doi.org/10.3389/fpsyg.2024.1387089

Walton, E., & Engelbrecht, P. (2022). Inclusive education in South Africa: Path dependencies and emergences. *International Journal of Inclusive Education, 28*(10), 2138–2156. https://doi.org/10.1080/13603116.2022.2061608

Yao, N., & Wang, Q. (2024). Factors influencing pre-service special education teachers' intention toward AI in education: Digital literacy, teacher self-efficacy, perceived ease of use, and perceived usefulness. *Heliyon, 10*(14), e34894. https://doi.org/10.1016/j.heliyon.2024.e34894

Zhang, J., & Zhang, Z. (2024). AI in teacher education: Unlocking new dimensions in teaching support, inclusive learning, and digital literacy. *Journal of Computer Assisted Learning, 40*(4), 1871–1885. https://doi.org/10.1111/jcal.12988

APPENDIX A

Evaluation of the effectiveness of the approach to inclusive learning

Students are asked to rate each question using a 3-point scale and provide additional detailed comments:

1. Evaluate the overall effectiveness of the selected approaches and practices for implementing inclusive learning
2. Did the use of interactive platforms Genially, Jamboard contribute to the development of theoretical and practical skills?
3. Did the new approaches and practices used affect your motivation?
4. Evaluate the possibility of self-development during the training period.
5. Did the new approaches and practices used ensure the development of socialization?
6. Did the approaches and practices used create barriers to learning?
7. Did the new approaches and practices used promote active learning?
8. Assess the possibility of focusing on individual learning pace using new approaches and practices
9. Did the focus on checking the psychological state during learning contribute to a positive adjustment of the learning process?
10. Did this approach to learning ensure equal opportunities for all participants?
11. Did this teaching approach have a positive impact on the interaction between students?
12. Did the interactive approaches used improve learning outcomes?

APPENDIX B

Table B1

Summary table of student responses to the questionnaire to determine the effectiveness of the approach to learning (expected data for the study)

Number of students	Questionnaire questions											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
1	2,8	2,1	3,0	2,2	2,1	1,8	2,9	2,2	2,3	2,2	1,9	2,4
2	2,2	2,7	2,4	1,2	2,3	2,8	2,2	2,4	2,8	1,9	2,3	2,3
3	2,3	2,6	2,3	2,7	2,0	2,6	2,4	2,0	2,3	2,1	2,7	2,0
4	2,2	2,3	2,9	2,4	1,3	2,0	2,9	2,0	2,9	2,2	2,8	3,0
5	2,4	1,0	2,2	2,3	2,7	2,1	2,2	3,0	2,3	2,4	2,1	2,2
6	2,0	2,4	2,3	2,8	2,2	1,9	2,9	1,8	3,0	1,9	2,0	2,1
7	2,3	2,8	2,3	1,3	2,6	2,4	2,4	2,2	2,1	2,7	2,2	2,1
8	2,9	2,4	1,2	2,3	2,2	2,3	2,5	2,4	2,3	2,3	2,9	2,2
9	3,0	2,2	2,1	3,0	2,2	2,0	2,2	2,3	2,7	2,3	2,2	1,3
10	2,2	3,0	1,0	2,3	2,4	2,2	2,5	2,1	2,4	2,4	2,8	2,1
11	2,4	2,3	2,4	2,0	2,5	2,3	2,3	3,0	2,2	2,1	2,0	2,9
12	2,8	2,4	2,2	2,3	2,2	2,0	2,1	2,7	2,8	2,2	2,3	2,2
13	2,1	3,0	2,4	2,3	2,2	2,6	2,3	2,2	2,4	2,1	2,0	2,2
14	2,3	2,4	2,3	2,2	2,1	2,2	2,1	2,3	2,2	2,3	2,2	2,4
15	2,1	2,9	2,3	2,9	2,3	2,9	2,4	3,0	2,3	2,7	2,1	2,1
16	2,7	2,2	1,0	2,4	2,0	2,3	2,1	2,1	2,3	2,2	2,1	2,2
17	2,3	2,2	2,1	2,1	2,2	2,6	2,4	2,4	3,0	2,1	2,3	2,1
18	2,1	2,0	2,1	2,0	2,3	2,3	2,2	2,1	2,3	2,3	2,2	2,3
19	2,2	2,7	2,3	2,3	3,0	2,4	3,0	2,0	2,1	2,8	2,2	2,4
20	3,0	2,2	2,1	2,9	2,3	2,2	2,6	2,2	2,4	2,0	2,2	2,1
21	2,1	2,8	2,3	2,8	2,2	2,1	2,4	2,3	2,9	2,3	2,1	3,0
22	2,6	2,1	2,3	2,1	2,4	2,6	2,0	2,0	2,1	2,8	2,2	2,7
23	2,3	2,1	2,5	3,0	2,2	2,,1	2,3	2,8	2,9	2,2	2,3	2,0
24	2,9	2,0	2,1	2,1	2,2	2,3	2,4	2,1	2,0	2,4	2,2	2,1
25	2,1	2,9	3,0	2,8	2,3	2,4	2,2	2,2	2,4	2,3	2,1	2,0
26	2,3	2,0	2,1	2,2	2,4	2,7	2,1	2,3	2,8	2,1	2,6	2,3
27	2,7	2,8	2,0	2,3	2,1	2,3	2,6	2,2	2,0	2,9	2,4	2,5
28	3,0	2,1	2,8	2,0	2,1	2,2	2,3	2,3	2,0	2,1	2,1	2,0
29	2,2	2,7	2,3	2,1	2,2	2,9	2,3	2,4	2,3	2,6	2,8	3,0

Note. Developed by the authors based on student responses.

Table B2

Summary table of students' answers to the questionnaire on the effectiveness of the approach to teaching (real data after the study)

Number of students	Questionnaire questions											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
1	2,7	2,8	2,6	2,7	3,0	2,8	3,0	3,0	2,9	2,8	2,8	3,0
2	2,7	2,8	2,3	2,9	2,9	3,0	3,0	2,9	3,0	2,8	2,7	2,7
3	2,8	2,8	2,7	3,0	3,0	2,4	2,9	2,8	2,8	3,0	2,6	2,9
4	2,9	2,9	2,3	2,7	2,8	2,9	2,6	2,2	2,7	2,8	2,8	2,7
5	3,0	2,8	2,1	2,8	2,7	2,7	2,0	2,9	2,8	2,7	2,5	2,6
6	2,0	2,2	3,0	3,0	2,8	2,3	2,7	2,7	2,9	2,9	3,0	3,0
7	2,1	2,7	2,8	2,7	2,0	2,9	2,9	3,0	2,7	2,6	2,5	2,8
8	2,9	3,0	2,3	2,8	3,0	2,7	2,3	2,9	3,0	3,0	3,0	2,9
9	2,7	2,8	3,0	3,0	2,3	2,9	2,7	2,7	2,4	2,7	2,8	2,8
10	2,8	2,4	2,7	2,1	2,8	2,7	2,2	2,9	2,8	2,9	2,8	3,0
11	2,8	3,0	2,9	2,8	2,7	2,0	2,8	2,1	2,6	2,7	3,0	2,5
12	2,7	2,0	2,9	2,7	2,5	2,6	2,7	2,4	2,8	2,8	2,9	3,0
13	2,3	2,9	2,7	2,3	2,9	2,2	2,8	2,8	2,9	2,8	2,6	2,7
14	2,7	2,9	2,2	3,0	3,0	2,9	2,7	2,4	2,8	3,0	2,8	2,7
15	2,8	2,1	2,8	2,9	2,7	2,3	3,0	3,0	2,7	2,8	2,9	2,9
16	3,0	2,8	2,6	2,9	2,0	2,9	2,9	2,8	2,6	2,5	3,0	2,7
17	2,6	2,1	2,8	2,9	2,9	3,0	2,8	2,3	2,6	2,9	2,7	3,0
18	2,7	3,0	2,8	2,7	2,1	2,9	2,7	2,6	3,0	2,5	2,6	2,9
19	2,0	2,9	2,4	2,8	2,7	3,0	2,5	2,7	2,9	2,7	2,9	2,7
20	2,8	2,2	2,7	3,0	2,6	3,0	2,9	2,3	2,7	2,8	2,9	2,8
21	2,9	2,8	2,1	2,6	2,7	2,9	2,7	2,6	3,0	2,7	2,6	2,9
22	2,9	2,9	2,9	2,8	2,0	2,9	2,7	2,9	2,8	3,0	3,0	2,9
23	3,0	2,5	2,9	2,5	3,0	2,3	2,9	3,0	2,3	2,6	2,7	2,8
24	3,0	2,9	3,0	2,4	2,9	2,8	2,8	2,8	2,9	2,6	3,0	2,6
25	2,9	2,0	2,9	2,8	2,5	2,9	2,7	3,0	3,0	2,9	2,8	2,7
26	2,8	2,1	2,7	2,6	2,7	2,9	2,8	2,1	2,7	3,0	2,6	3,0
27	2,3	2,7	2,6	2,3	2,9	2,2	3,0	2,8	2,9	2,7	2,8	2,8
28	2,0	2,9	2,1	3,0	2,8	2,9	2,8	2,5	2,2	2,6	2,7	3,0
29	2,7	2,8	2,9	2,9	2,7	2,3	2,6	2,5	2,7	2,8	2,8	2,9

Note. Developed by the authors based on student responses.

10.22633/rpge.v29iesp2.20658

Table B3

Correlation of answers of students of the experimental group (expected data before the study)

Means	Std.Dev	1	2	3	4	5	6	7	8	9	10	11	12
2,5	0,833333	1	-0,38005	-0,18269	0,028144	-0,11568	0,33178	-0,07757	0,021276	-0,32221	-0,01488	-0,03899	-0,31375
2,4	0,8	-0,38005	1	-0,03802	0,007051	-0,04725	0,33178	0,189891	-0,24233	-0,0159	0,203377	0,168099	0,102982
2,2	0,733333	-0,18269	0,998867	1	0,00166	-0,14323	-0,05716	0,170707	0,067924	0,091211	-0,10441	-0,36778	0,175448
2,3	0,766667	0,028144	0,007051	0,0016	1	-0,20328	-0,27347	0,16659	0,03773	0,287829	-0,08125	-0,04837	-0,25848
2,2	0,733333	-0,11568	-0,04725	-0,14323	-0,20328	1	0,215594	-0,10173	0,243782	-0,30698	0,340905	-0,29893	-0,15288
2,6	0,866667	0,33178	0,33178	-0,05716	-0,27347	0,215594	1	-0,36766	0,174608	-0,13878	0,22498	0,247668	0,102786
2,4	0,8	-0,07757	0,189891	0,170707	0,16659	-0,10173	-0,36766	1	-0,35891	0,055127	0,046694	0,065817	0,15199
2,3	0,766667	0,021276	-0,24233	0,067924	0,03773	0,243782	0,174608	-0,35891	1	0,056718	0,007653	-0,14766	0,014091
2,4	0,8	-0,32221	-0,0159	0,091211	0,287829	-0,30698	-0,13878	0,055127	0,056718	1	-0,56534	0,113616	-0,03765
2,3	0,766667	-0,01488	0,203377	-0,10441	-0,08125	0,340905	0,22498	0,046694	0,007653	-0,56534	1	0,093766	0,198736
2,3	0,766667	-0,03899	0,168099	-0,36778	-0,04837	-0,29893	0,247668	0,065817	-0,14766	0,113616	0,093766	1	0,164649
2, 3	0,766667	-0.31 375	0,102982	0,175448	-0.25 848	-0.15 288	0,102786	0,15199	0,014091	-0.03 765	0,198736	0,164649	1

Note. Developed by the authors on the basis of student responses.

Table B4

Correlation of answers of students of the experimental group (real data after the study)

Means	Std.Dev.	1	2	3	4	5	6	7	8	9	10	11	12
2,7	0,90001	1	-0,02483	0,045112	-0,07403	-0,0179	0,005045	-0,15338	0,012311	0,06666	0,116636	0,114863	-0,21531
2,6	0,866667	-0,02483	1	-0,39504	-0,02586	-0,0163	0,005045	-0,14077	0,093158	0,05111	-0,31114	-0,04143	-0,41985
2,6	0,866667	0,045112	-0,39504	1	-0,10226	-0,29953	-0,34644	0,307792	0,060903	-0,10211	-0,00253	0,30876	0,10986
2,7	0,9003	-0,07403	-0,02586	-0,10226	1	-0,16278	0,237024	0,136846	-0,21183	-0,23666	0,137838	0,151164	0,030156
2,7	0,9004	-0,0179	-0,0163	-0,29953	-0,16278	1	-0,32174	-0,0293	-0,07504	0,07441	0,361758	-0,03591	0,029374
2,7	0,9001	0,005045	0,005045	-0,34644	0,237024	-0,32174	1	-0,11402	-0,06776	0,067332	-0,01745	-0,12879	0,092996
2,7	0,90102	-0,15338	-0,14077	0,307792	0,136846	-0,0293	-0,11402	1	-0,02172	-0,17023	-0,17541	0,03945	0,064228
2,7	0,9003	0,012311	0,093158	0,060903	-0,21183	-0,07504	-0,06776	-0,02172	1	0,242507	-0,1215	-0,05568	-0,01153
2,8	0,933333	0,06666	0,05111	-0,10211	-0,23666	0,07441	0,067332	-0,17023	0,242507	1	0,288743	0,038665	-0,07754
2,8	0,933333	0,116636	-0,31114	-0,00253	0,137838	0,361758	-0,01745	-0,17541	-0,1215	0,288743	1	0,123789	0,324286
2,8	0,933333	0,114863	-0,04143	0,30876	0,151164	-0,03591	-0,12879	0,03945	-0,05568	0,038665	0,123789	1	-0,09565
2,9	0,966667	-0,21531	-0,41985	0,10986	0,030156	0,029374	0,092996	0,064228	-0,01153	-0,07754	0,324286	-0,09565	1

Note. Developed by the authors based on student responses.

CRediT Author Statement

Acknowledgements: We thank the Yuri Kondratyuk National University, Poltava Polytechnic University (Ukraine).
Funding: None.
Conflicts of interest: None.
Ethical approval: No ethics approval required.
Data and material availability: The data and materials used in this work are not available.
Authors' contributions: All authors participated equally in the construction of the article.

Processing and editing: Editora Ibero-Americana de Educação
Proofreading, formatting, standardization and translation