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General Information

About the Journal

Abai Journal of Pedagogy and Psychology is a peer-reviewed scientific and methodological journal founded in 2009 by Abai Kazakh National Pedagogical University. The journal focuses on key issues in education at all levels, from early childhood through higher education, and serves as a platform for academic discourse, research dissemination, and professional development in pedagogy and psychology.

Aims and Scope

The journal publishes original research articles, theoretical analyses, and methodological developments in the following areas:

1. Innovative Approaches and Practices in Modern Education;
2. Psychological and Pedagogical Problems of Professional Development of Education Specialists.

Editorial Strategy

The editorial board adheres to the following principles:

3. Impartial and objective peer-review process;
4. High standards of scientific rigor and methodological accuracy;
5. Collective decision-making based on expert consensus;
6. Efficient and transparent communication with authors;
7. Full respect for intellectual property rights;
8. Strict adherence to the publication schedule;
9. Limitation of publication frequency to a maximum of two articles per author per calendar year.

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4. Issue 4 – December

Review Process

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Language of Publication

The journal publishes all articles in English.

CONTENT

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Psychological and Pedagogical Problems of Professional Development of Education Specialists

Original Article
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Determining Students' Attitudes Towards Augmented Reality Technology technology

Abstract

Introduction. The study examines the impact of augmented reality technology on students' attitudes in primary school science education. The research investigates whether integrating augmented reality applications into science lessons produces measurable differences in student attitudes compared with traditional instructional methods. *Methodology and Methods.* A pedagogical experiment was conducted with 91 primary school students (46 in the experimental group and 45 in the control group) who voluntarily participated in the study during the fall semester of 2023–2024. The experimental group received instruction in science using augmented reality technology for four weeks, whereas the control group received traditional instruction. The "Augmented Reality Applications Attitude Scale" was administered to both groups to measure student attitudes. *Results.* Analysis of the results demonstrated that students in the experimental group who learned with augmented reality technology in science class significantly outperformed the control group in terms of positive attitudes toward learning. The experimental group showed greater engagement, interest, and motivation compared to students receiving traditional instruction. *Scientific novelty.* The effectiveness of augmented reality technology as a tool for positively shaping student attitudes toward science education in primary school has been empirically demonstrated through a controlled pedagogical experiment. *Practical significance.* The findings suggest that augmented reality applications can be successfully integrated into primary school science instruction to enhance student attitudes and engagement, providing a practical framework for teachers seeking to improve the quality of the educational process through technology-enhanced learning.

Keywords: science lesson, augmented reality, primary school, distance learning.

Introduction. It is recognized and used that the changing and developing technologies in today's times create a more qualified environment in educational environments, as in all environments. It is also known that materials designed with new technological possibilities are preferred to be used in education (Çelik et al., 2023). As may be observed, there is a growth in research on the implementation of augmented reality technologies in the classroom, which are thought to be included in education in general and make a great contribution to education (Zhang et al., 2023). With augmented reality technology, it is also seen as a method that enables students and educators to present many objects, applications and experiments in very different dimensions that they cannot reach or embody in the real world, along with various inadequacies in educational activities in education and dimension (Nasongkhla & Sujiva, 2023). In addition to these, it is seen

that augmented reality technology applications play an important role in educational life as they allow interaction with virtual and real objects in education, provide learning by doing, and increase attention and motivation. (Abdul Hanid et al., 2022).

The inclusion of technology's augmented reality environments is defined as the simultaneous acquisition of images as a result of connecting real concepts and materials produced by smart devices to certain points of the image with special software, while educational materials produced by various computers and their derivatives are displayed in front of the camera (Low et al., 2022). In other words, augmented reality is the visualization of objects or any shape displayed on computers or mobile devices and the reflection of the object on the screen as if it were real for the user (Assem et al., 2022). Along with these, thanks to the augmented reality technologies system and technology, an object or event that does not exist in real life can be seen in the palm of your hand on the smart device screen, and learning events can increase by feeling it (Rahma et al., 2021).

It is known that there are many studies and research within the literature on the importance of augmented reality applications and their applications in different fields (Fetaji, 2020). While some of these studies are experimentally designed, it can be said that some of them are designed according to the survey model (Chiang et al., 2022). Augmented Reality-based course material has been developed for the English preparatory class in the study that is always done by education with augmented reality (Ebadi & Ashrafabadi, 2022). It is seen that there are studies that reach the conclusion that students experience enriched learning experiences by structuring the knowledge in the teaching they carry out with these materials, and it is anticipated that this study will also benefit. In addition to these, he stated that the physics course conducted with the augmented reality environment in different fields provides an advantage for the students in understanding, explaining, and transforming the lesson from abstract to concrete (Demircioglu et al., 2022).

The fact that the concepts taught with this technology in the realm of education are combined to use what is learned in digital environments, together with the uses for augmented reality devices, attracts the attention of educators and the new generation of students who are studying in their fields (Kao et al., 2022). Applications using augmented reality enable students to be involved in a learning process suitable for a constructivist approach in education and enable students to use technology effectively (Drljević et al., 2022). Although the quantity of scientific studies on the application of augmented reality technologies in the classroom is growing, it is a matter that requires further investigation in a multi-dimensional way (Lin et al., 2023).

Although the importance of the application with the augmented reality technologies mentioned and transferred is seen once again, it is among the expectations that it will be important in this study. This study will continue with augmented reality applications according to science lessons and will be designed for primary school students.

Related Research. In the investigation of McCord et al. (2022), augmented Reality education aimed to focus on the use of 3D models to assist pupils in understanding design, and in the results part of the research, it is aimed that educators make educated choices about utilizing comparable educational exercises to get their pupils ready to understand the 2D design documents used. They seem to have come to the conclusion that 2D documentation and augmented reality benefit them. As it is understood from the above research, it is seen that augmented reality technologies provide benefits by touching the lives of students.

Su et al. (2022) aimed to use augmented reality technology with the game in which the students are divided into duos, which encourages friendly rivalry between them and encourages them to find out more. As a result, in their research, augmented reality is widely beneficial for students. and also that our

system is easy to use, and it achieves positive results, as actually competing with peers motivates them to do better.

In the study of Amores-Valencia et al. (2022), the purpose of this study was to explain the impact of augmented reality on secondary education pupils' academic performance and motivation, and as a result, in their study, AR's application in the classroom was reflected by elements like attention, interest, trust, and satisfaction. They found that it provides a higher level of motivation and reflects and shows improved test scores performed on the experimental groups compared to the control group.

Augmented reality's application in education has started to spread across numerous disciplines. Science education is among the best-suited industries for augmented reality. There is some research available when searching the ERIC (eric.ed.gov) index, but not enough. Four students with learning difficulties were to be taught "Solar Systems and Planets" using an augmented reality-based intervention; Yenioglu et al. (2024) were to investigate the efficacy of this approach. Kalemkus & Kalemkus (2023) examined the impact of augmented reality applications on scientific education students' academic progress. In Atalay's (2022) study, preservice teachers were asked to use an augmented reality application to generate lesson plans for science themes and goals in grades three and four. Chou et al. (2022) investigated whether learning strategies that incorporate augmented reality and multidimensional concept maps (ARMCMs) would improve learning more than those that only use MCMs and AR in terms of learning effectiveness, motivation, satisfaction, and cognitive load. Kul and Berbe (2022) investigated how students' academic progress on elements and compounds, as well as their motivation toward the science course and the augmented reality materials utilized, were affected by an augmented reality-enhanced seventh-grade science course.

Although primary school pupils are anticipated to benefit most from augmented reality technology, it is also anticipated that this technology will add to the body of knowledge and provide insight into the lives of future generations. It has to do with the fact that the studies included in the section on related research are mostly utilized in the instruction of science and literature in many subject areas. Nonetheless, a wide variety of disciplines are taught in the field of scientific education. Regarding the utilization of augmented reality applications in this subject, further research findings are required.

The research and literature are largely benefited by the studies included in the relevant research section. According to this study, augmented reality technology is anticipated to have significance mainly for elementary school pupils, but it is also anticipated that it will add to the literature and illuminate future generations. This study's objective is to ascertain student attitudes towards augmented reality technology.

Materials and Methods. In this section of the research, it is observed that information will be given about the method used in the research, the tools, the participant groups, some demographic information, and the instrument used to collect data. All these values in the study were collected by the investigators and added in this section, and the research was advanced by making all the necessary detailed explanations.

Model of Research. The experimental design of the research and creation of the quantitative research model are clearly visible. When considering the quantitative study model, it is evident that this model is seen as the arrangement of the necessary conditions for gathering and evaluating data in accordance with the research purpose and economically. Comparison of more than one experimental group takes place in the literature, where it is predictable. The quantitative research approach is a research model that may be used to create graphs, charts, or tables with different numbers associated with such data and study themes (Oz et al., 2021). This research starts by using quantitative research techniques to compile

the effects of augmented reality technology on primary school pupils' academic success.

Working Group/Students. In this part of the research, it is known as the section where the information on the students added to the study is included. 91 children who continued their education at Almaty, Kazakhstan's primary schools during the fall academic year of 2023–2024 were the subjects of this study. The study's instrument for gathering data was administered in person to 91 participant groups and was approved.

*Gende*r. As may be observed, the numbers of male and female students are randomly chosen linearly while creating the gender section. In addition, the details of separating the gender data of the students are given in Table 1.

Table 1
The study's gender-valued distribution of primary school pupils

Gender	Boy		Girl	
	F	%	F	%
Variable	46	50.55	45	49.45

As can be seen, Table 1 incorporates the data that the participating groups contributed and supplied for the study. In this context, it is seen in Table 1 that 50.55% (46) are male students, while 49.45% (45) are female students. It is evident that every piece of information provided in this section accurately depicts the distribution.

Internet Usage Situations During the Day. In this part of the study, the participants' daytime internet usage was investigated, and each value is presented in detail in Table 2.

Table 2
Daily internet usage status of students from primary schools taking part in the study

Internet usage situations during the day	1-2 times		3-4 times		5 or more hours	
	F	%	F	%	F	%
Variable	2	2.18	56	61.54	33	36.26

The internet usage status of both the experimental group students and the control group students in the study was examined according to the problem situation of the research, and it is seen that the results are given in Table 2. If Table 2 is interpreted on this scope, 2.18% of the students (2 people) use the internet during the day, and it is seen that they browse the internet between 1-2 hours, 61.54% (56 people) stated that they use the internet between 3-4 hours. 36.26% (36 people) stated that they spend 5 hours or more on the Internet.

Smart Device Preference Status of the Control and Experimental Groups Participating in the Study

In this part of the study, the smart device preference statuses of the control and experimental Groups included in the study were examined in accordance with the research's problem state, and Table 3 provides the pertinent data.

Table 3
Smart device preference status of the control and experimental groups participating in the study

Smart Device	Smart Phone		Tablet	
	F	%	F	%
Variable	85	93.41	6	6.60

When Table 3 is examined, the use of smart devices preferred by the students in the control and experimental groups included in the study was investigated, and 93.41% (85 people) stated that they use smartphones, while 6.60% (6 people) use tablets. Findings in smart device preference situations represent the real dissemination.

Data Collection Tools. The part that consists of the most important parts in the studies is known as the instrument for gathering data, and the instrument for gathering data determines the course and direction of a study. In this research, it is seen that the "Augmented Reality Applications Attitude Scale" was developed and patterned by Küçük et al. (2014). If the data collection

tool part of the study is handled carefully, if the "Augmented Reality Applications Attitude Scale", which was used and preferred by the researchers before, is explained, it is seen that this scale includes 15 5-point Likert-type items. The items in the scale were evaluated with expressions such as “Strongly Disagree”, “Disagree”, “I am undecided”, “Agree”, and “Strongly Agree”. The Cronbach Alpha value of the original scale is .835 in the literature. On the other hand, the data collection instrument was obtained from the research participant groups via a face-to-face interview.

Procedure. The goal of this research is to examine how augmented reality technologies affect the academic performance of both experimental and control group students. Its objective is to give the students in the experimental group an education that differs from that of the students in the control group.

Experimental Group: Students in the experimental group taking part in the study received the course materials for the augmented reality technology science course from using web tools in a distance education environment. Science lessons were transferred as videos thanks to the Microsoft team’s tool. The duration of the science lesson videos was determined according to the augmented reality lesson dimensions, and the average video length was limited to 18-20 minutes. While watching science lesson videos, primary school students were given the ability to use all presentation files related to the subject or to download them to their smart devices. In addition, it was checked that the experimental group students followed the science lesson education system on a weekly basis, and the students who did not attend the lesson were ensured to participate. After the students watched the videos on the system, test questions were shared in order to reinforce them.

Control Group: For the control group of the research, only the presentation files for science lessons were transferred to the system using distance education. Both groups took an accomplishment test at the start of the study. The test of achievement was administered to both groups for the last time at the conclusion of the 4-week course. The two tests that were used were assessed on a scale of 100.

Compliance with Ethics. This study examines how augmented reality technology affects elementary school pupils' performance was aimed at and it is seen that this study, which was compiled to teach these, was compiled by taking into account the rules in terms of some ethical committees. In addition, the concept dimensions of volunteerism were mainly applied for this research, and the information was explained to the people who participated in the study one by one. All participant groups in the study were included voluntarily, and those who did not want to take part in this study were excluded from this study. Demographic and identity information was kept secret to establish the integrity of the participant groups, and a code name was arranged for primary school students; their original information was kept. All the detailed information to be transferred to the study was explained to the students, and the people who participated voluntarily were expected to comply. Finally, all the questions asked by pupils in elementary school were answered in the field of application, and it was explained that the research was not specific to them but general. Finally, the ethics committee approval form was shown to the students and their families, and the whole scenario was designed according to this fact.

Data Analysis Technique. Frequency (f), percentage (%), mean (M), standard deviation (SD), and t-test (t) were used in the statistics program to examine the data collected from the primary school pupils who took part in the study. The program's data are presented in the findings section along with tables and remarks.

Results. According to the research's conclusions, the problem scenario questions were answered by forming an answer. Additionally, several interpretations were offered in accordance with each discovery.

How students in experimental and control groups view augmented reality technologies. Table 5 currently contains

detailed data regarding the attitudes of students in the experimental and control groups toward augmented reality technology.

Table 5

Views of students regarding the augmented reality technology used in the control and experimental groups

Student Testimonials on Moodle App Effectiveness	Experiment Group		Control Group	
	M	SD	M	SD
I like lessons taught with augmented reality applications.	4.28	0.52	3.42	0.81
I get bored using augmented reality apps.*	4.31	0.52	3.41	0.84
Augmented reality apps are difficult to use.*	4.25	0.51	3.44	0.85
I can pay better attention to the lesson when augmented reality applications are used.	4.26	0.53	3.42	0.84
Thanks to the augmented reality applications, the lesson is more I work	4.29	0.51	3.46	0.79
Augmented reality apps confuse me, making learning more difficult. *	4.26	0.46	3.39	0.81
When augmented reality applications are used, I come to the lesson more willingly.	4.28	0.73	3.42	0.83
No use of augmented reality applications in lessons There is no need.*	4.33	0.65	3.37	0.74
3D objects in augmented reality applications gives a sense of reality.	4.32	0.63	3.35	0.85
Augmented reality applications do not interest me.*	4.34	0.41	3.32	0.81
Videos of 3D objects in the book in augmented reality applications. Displaying animations increases my curiosity about the subject	4.36	0.52	3.31	0.88
I would like to include augmented reality applications in textbooks in the future.	4.41	0.54	3.38	0.79
Applications for augmented reality are something I would like to incorporate into other classes.	4.42	0.58	3.46	0.78
It is a waste of time to employ augmented reality applications in the classroom.*	4.42	0.63	3.72	0.81
I like using augmented reality apps to learn at home. Average for the Whole	4.41	0.55	3.62	0.88

According to Table 5, the post-test findings comparing the opinions of students in the experimental group and those in the control group about augmented reality technology showed a significant difference ($p<0.005$). In addition, the reverse process was applied in order to obtain the statistical values of the negative values stated on the scale.

Even though every statement differs significantly, the post-test results show that one of the most notable statements made by the experimental group's students is “I would like to include augmented reality applications in the textbooks in the future,” with a M = 4.41 point average, whereas the control group's evaluation result is M = 3.38. Secondly, among the most notable manifestations of the students in the experimental group, "I would like to use augmented reality applications in other lessons", was M = 4.42, while M = 3.46 in the control group. With the findings obtained, one may say that the pupils in the experimental group have a positive change in their sense of confidence thanks to augmented technology, and they have the opportunity to use augmented reality technology whenever and wherever they want to reinforce it, and it contributes positively to their understanding of the lessons of education.

Additionally, the experimental group's students said that "displaying 3D objects, videos, and animations in the book in augmented reality applications increases my interest in the subject", according to the post-test findings. In contrast, the control group's average score was M=3.31, but the experimental group's was M=4.36. From the statements of the pupils in the test group, "I can pay better attention to the lesson when augmented reality applications are used," M=4.26, while the final result in the control group is M= 3.42. Finally, one of the

experimental group's students' most noticeable expressions, “I come to the lesson more willingly when augmented reality applications are used,” was *M*=4.28, while the final result in the control group was *M*=3.42.

Given the aforementioned results, it can be concluded that the viewpoints of the research participant groups on augmented reality technologies have a positive value, and while they have the opportunity to learn the subjects, they learn more easily. More understandable course environments are created thanks to the resources and technology provided by augmented reality technologies.

Discussion. The purpose of this study was to compare and investigate the potential added value of an experimental study, a control group, and digital lecture notes, using a traditional teaching approach and an augmented reality application for education, with the experimental group. The study revealed differences in attitudes towards the augmented reality application between the two groups. A thorough analysis of these findings reveals that the experimental group members were preferred over the control group due to variations in attitude items between the two groups. Based on this result, it is concluded that augmented reality technology provides meaning and benefit to students in science education.

To improve learning outcomes, Benrahal et al. (2022) aimed to prioritize the use of Augmented Reality (AR), one of the most recent technical advancements, as a teaching aid. They also looked into how social influence affects behavioral intention to use augmented reality learning. When this value of the research is compared and evaluated with the results of this study, it is evident that the pupils in the experimental group expressed that they enjoyed the lessons given with augmented reality applications and wanted to spend more time with this technology. With these values, augmented reality technology gives meaning to two separate studies, and the idea that this technology will support motivational types of education is always present in the literature.

Gao et al., (2023), in their research, aimed to present the effect of a mobile augmented reality application on students. Consequently, the pre- and post-test results of their investigation showed that the augmented reality software improved students' comprehension and communication of the material. They concluded that their experience with the application was favorable. The experimental group students' pre-test scores on the augmented reality application before training and their post-test scores on the augmented reality technology application after training differ significantly, according to the study's findings, when combined with this research.

Each study is expected to shed light on the literature while providing augmented reality and meaning for students in this field. In this study, the fact that primary school students benefit from augmented reality technology means that their use of technology in every sense in their future lives will create a more productive and learning society. The expectation of a repeat of this study elsewhere is increasing.

Conclusions. Looking at the results section, which adds a different meaning and integrity to the studies. The quantity of pupils is the most important factor. A thorough analysis of the student numbers reveals that a total of 91 people, 41 in the experimental group and 40 in the control group, voluntarily participated in this research. Another valuable aspect of the research is the examination of the internet usage patterns of both the experimental and control group students throughout the day, and the conclusion that 3–4 hours of internet use was the most desired. This implies that it would be advantageous to train the elementary school students who took part in the study. Examining how the experimental and control groups' pupils used smart gadgets and concluding that most of them preferred them is another important component of the study. This also serves as an educational tool among the opportunities offered to them. Another valuable finding among the study's results is that the final test results regarding the opinions of the pupils in

the augmented reality technology test group were higher than those in the control group, and a significant difference was detected. Furthermore, the study shows that the participating groups have positive views regarding augmented reality technologies, that they find easier learning opportunities, and that more understandable learning environments are created thanks to the resources and technology provided by augmented reality technologies. Although the experimental group's students' attitudes toward the augmented reality technology environment were at the "strongly agree" level, the control group's average scores in this area were at the "agree" level. This is significant for the experimental group's students and has a higher value than the control group's students' knowledge level. It is evident from a careful examination of the study's findings that students in the test group use augmented reality technologies in scientific classes more successfully than those in the control group.

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Approaches to Developing Media Literacy in Parents of Children with Digital Autism

Abstract

Introduction. The study examines approaches to developing media literacy among parents of young children, focusing on families raising children with autism spectrum disorder (ASD) or autism-like symptoms associated with excessive passive screen exposure. The purpose was to assess baseline parental media literacy and mediation practices and to evaluate a short, culturally adapted media-education programme in Kazakhstan. *Methodology and Methods.* A quantitative quasi-experimental pretest–posttest design with a comparison group was applied. The sample included 56 parents of children aged 3–8 years, sampled through preschools, primary schools, and psychological–pedagogical centres. Media literacy was measured with a composite questionnaire, and mediation patterns and behaviours were also assessed. The intervention comprised four weekly group sessions with home tasks. Data were analysed using descriptive statistics, t-tests, chi-square tests, and Cohen's d; ethics included informed consent, voluntary participation, and confidentiality. *Results.* Baseline media literacy was medium, with a gap between technical skills and critical components. Parents of children with "digital autism" more often used screens for calming and less frequently practiced co-viewing. After the programme, the experimental group increased the media literacy index and shifted toward active/enabling mediation. *Scientific novelty.* This study reveals the structure of parental media literacy in early childhood and links it to mediation patterns in families raising children with autism spectrum disorders/"digital autism." Practical implications. *Practical significance.* The programme may be used as a modular parent-training component in preschool, inclusive education, and counselling services to reduce reliance on screens as a "digital pacifier" and to strengthen reflective mediation.

Keywords: parental media literacy; digital autism; autism spectrum disorder; screen time; parental mediation; early childhood; inclusive education.

Introduction. Rapid digitalization has transformed everyday life, reshaping childhood and family communication and making connected devices central to children's leisure, learning, and socialization. Media and digital literacy are widely regarded as essential life skills and, for parents, a prerequisite for responsible mediation of young children's media use (Hobbs, 2010; 2011; Livingstone & Helsper, 2008; Helsper et al., 2024).

Recent discourse has popularized the term "digital/virtual autism" to denote autism-like symptoms that are claimed to be

associated with excessive passive screen exposure; however, professional guidance emphasizes that this is not a formal diagnosis but rather a warning label linked to developmental delays, prolonged unguided screen time, and reduced caregiver–child interaction. Research also associates high early screen use with attention, sleep, and socio-emotional difficulties, particularly when screens displace communication and play (Kardaras, 2016). At the same time, work in ASD indicates that digital media can both increase risks and offer opportunities for communication, learning, and participation, and that the quality of parental mediation may be more important than restriction alone (Pliska et al., 2023).

Parental mediation encompasses restrictive, active, and enabling strategies; evidence indicates that stronger parental digital skills and more nuanced risk perceptions are associated with greater use of active/enabling approaches, rather than reliance on technical controls alone (Livingstone et al., 2017; Helsper et al., 2025). Parental media literacy is increasingly conceptualized as multidimensional, combining technical competence, critical evaluation, algorithmic/commercial awareness, and developmental sensitivity, and higher parental social media literacy has been linked to lower levels of child digital addiction (Hobbs, 2011). Policy reports likewise highlight that many parents feel insufficiently informed as platforms evolve rapidly (UNESCO, 2025).

Clinical guidance also underscores bidirectionality: in some datasets, higher screen time precedes later parent-reported autism diagnoses, yet early autistic traits may themselves contribute to greater reliance on screens; accordingly, media-education perspectives stress relational and contextual determinants and the importance of purposeful, adult-mediated use (Hobbs, 2011; Pliska et al., 2023). Researchers additionally note that parents often underestimate background media exposure and the use of "digital pacifiers." Russian-language scholarship associates low parental media literacy with inconsistent rules, limited parent-child discussion, and patterns of either excessive control or delegation of regulation to devices; in this view, "digital autism" is frequently interpreted as an outcome of mediation deficits rather than screens per se (Kardaras, 2016; Gritsai, 2025; Chelysheva, 2023; Gavrilova & Mashanova, 2022).

In Kazakhstan, MIL is increasingly embedded in educational initiatives, but structured support for parents remains scarce; educators often frame MIL primarily in terms of misinformation, while family-focused media education is addressed less consistently (UNESCO, 2025). Survey data point to early adoption of social networks and streaming services, alongside a gap in parents' skills related to monitoring, safety settings, and discussing risks with children. One study of 362 parents reported substantial unsupervised screen time among pre-schoolers and low awareness of "digital autism," together with noted withdrawal and communication difficulties patterns aligned with earlier Russian findings on diffuse family media norms (UNICEF Kazakhstan, 2024; Zhanaliyeva & Zhukenova, 2025; Chelysheva, 2023; Gritsai, 2025).

Russian and Kazakhstani scholars have proposed a range of media-education interventions for parents, from brief school-based informational sessions to more comprehensive programmes aimed at developing family media culture. Chelisheva's handbook on parent media education emphasizes systematic joint work with children on analysing advertising, news, and entertainment content, establishing rules for shared viewing, and encouraging creative media production within the family (Chelisheva, 2023). The psycho-pedagogical programme "Parent Media Literacy" developed by Gavrilova and Mashanova (2022) is designed for parents of preschool and primary-school children and combines lectures, discussions, and practical tasks focused on age-appropriate screen use, co-viewing practices, and digital safety (Gavrilova & Mashanova, 2022).

Recent Kazakhstani initiatives supported by international organizations aim to help parents identify online risks, build trust-based communication with children, and use simple tools to strengthen digital safety practices (UNICEF Kazakhstan, 2024; UNESCO, 2025). However, these programmes seldom engage with the specific realities of families raising children with ASD or autism-like traits, where screens may be used both for self-regulation and as a channel for learning and social participation (Pliska et al., 2023; 2025). International research on autistic people's digital participation likewise highlights the need for tailored guidance that balances sensory sensitivities and communication preferences with opportunities for inclusion (Pliska et al., 2023).

Overall, the literature indicates that efforts to develop media literacy among parents of children with "digital autism" should:

– be grounded in evidence-based understandings of screen use, child development, and ASD rather than alarmist narratives;

– combine core media-literacy components (critical analysis, content creation, and understanding of media systems) with practical parenting skills such as co-viewing, negotiating rules, and modelling healthy media habits (Hobbs, 2011; Livingstone & Helsper, 2008);

– account for national and cultural contexts, including Kazakhstan's media environment and existing MIL policies;

– directly address the needs of families raising children with ASD, where digital media may operate both as a risk factor and a resource.

Building on these strands of research, the present article seeks to systematize pedagogical and psychological approaches to developing media literacy among parents of children showing signs of "digital autism" in Kazakhstan, addressing both the preventive and compensatory functions of family media education.

Materials and Methods. The study employed a quantitative quasi-experimental pretest–posttest design with a comparison group. Parents were assigned either to an experimental group that completed a structured media literacy programme or to a comparison group that received only brief written recommendations. The final sample comprised 56 parents (44 mothers and 12 fathers) of children aged 3–8 years. Thirty-one parents reported that their child had ASD or autism-like symptoms that specialists associated with excessive screen exposure (the "digital autism" group), whereas 25 parents reported no developmental diagnoses. Participants were recruited via preschools, primary schools, and psychological–pedagogical centres in a large Kazakhstani city; participation was voluntary, and the groups did not differ significantly in key socio-demographic characteristics.

Parental media literacy was assessed using a composite questionnaire that included items on technical–operational skills, critical evaluation of content, and awareness of commercial/algorithmic influences. Responses were recorded on a 5-point Likert scale and summed into subscales; these were then converted to a 0–100 metric using the transformation:

$$I_{is} = \frac{Raw_{is} - Min_s}{Max_s - Min_s} \cdot 100$$

where I_{is} is the standardized score of respondent i on subscale s Raw_{is} is the raw sum of item scores, and Min_s ical minimum and maximum. The overall media literacy index was computed as the arithmetic mean of the standardized subscales. Additional items captured parental mediation practices (restrictive, mixed/inconsistent, active/enabling) and specific behaviours, including using screens as a calming strategy, co-viewing, and the presence of household rules, as well as parents' awareness and understanding of the term "digital autism".

The intervention comprised four weekly group sessions (60–90 minutes each) during which parents in the experimental group received psycho-educational input, analysed examples of children's media content, and worked on planning family media routines. The same set of instruments was administered to both groups before the programme began (pre-test) and shortly after it ended (post-test). For a subset of the experimental group, brief follow-up questions were also collected regarding perceived changes in media practices.

Data Analysis. Data analysis comprised descriptive statistics (means, standard deviations, frequencies, and percentages) and inferential testing. Differences in continuous indices between groups and overtime were examined with t-tests; for independent samples, the statistic was calculated as:

$$t = \frac{\overline{X_1} - \overline{X_2}}{\sqrt{\frac{S_1^2}{n_1} + \frac{S_2^2}{n_2}}}$$

where $\overline{X_1}$, and$\overline{X_2}$ are group means, $\frac{S_1^2}{n_1}$, and $\frac{S_2^2}{n_2}$ are variance terms, and n_1, n_2 are sample sizes. Categorical variables, including mediation patterns and key behaviours, were compared using chi-square tests of independence. Effect sizes for mean differences were reported as Cohen's d. The study adhered to basic ethical principles, including informed consent, voluntary participation, confidentiality, and the right to withdraw without consequences.

Results. The final sample included 56 parents of children aged 3–8 years (one parent per child). Thirty-one parents reported an ASD diagnosis or autism-like symptoms linked by specialists to excessive screen exposure ("digital autism" group), while 25 reported no developmental diagnoses (comparison group). Most respondents lived in urban areas (71.4%, n = 40), had higher education (58.9%, n = 33), and had daily access to smartphones and home broadband (94.6%, n = 53). The intervention and comparison groups did not differ significantly in parental age, education, or socio-economic status (all p > .05), indicating baseline comparability.

Table 1
Sample characteristics (N=56)

Indicator	n	%
Total number of parents	56	100.0
Mothers	44	78.6
Fathers	12	21.4
"Digital autism" group (child with ASD / DA)	31	55.4
Comparison group (no developmental diagnosis)	25	44.6
Urban residence	40	71.4
Higher education	33	58.9
Daily access to a smartphone and broadband at home	53	94.6

At baseline, the overall parental media literacy index (0–100) indicated a medium level (M = 57.3, SD = 11.4). Scores were higher for basic technical skills (M = 68.9, SD = 10.2) than for critical evaluation of content and awareness of commercial and algorithmic influences (M = 49.7, SD = 12.7).

Parents of children with "digital autism" and those in the comparison group did not differ significantly in the overall media literacy index (M = 56.4 vs. 58.4; p = 0.218). However, profile analysis showed that the "digital autism" group had lower scores in critical appraisal of child-directed content (M = 46.1 vs. 52.9; p = 0.032), relied more on screens as a calming tool (73.9% vs. 49.3% used screens to manage tantrums "often/very often"; $\chi^2(1) = 10.87$; p = 0.001), and reported less frequent co-viewing and discussion of

content (28.3% vs. 41.9% “often/very often”; $\chi^2(1) = 4.18$; $p = 0.041$).

Table 2

Baseline media literacy and mediation indicators by group

Indicator	“Digital autism” group (n = 31)	Comparison group (n = 25)	Statistic
Total media literacy index, M (SD), 0–100	56.4 (11.6)	58.4 (11.1)	$p = 0.218$
Critical assessment of child-directed content, M (SD)	46.1 (12.9)	52.9 (11.8)	$p = 0.032$
Use of screens as a calming tool “often/very often”, %	73.9	49.3	$\chi^2(1) = 10.87$; $p = 0.001$
Co-viewing and discussion “often/very often”, %	28.3	41.9	$\chi^2(1) = 4.18$; $p = 0.041$

Across the sample, three main parental mediation patterns were identified: primarily restrictive mediation (34.5%), characterized by clear time limits and content bans with little discussion; mixed or inconsistent mediation (42.9%), marked by unstable rules, irregular monitoring, and situational use of screens as rewards or distractions; and active/enabling mediation (22.6%), combining rules with co-viewing and discussions of content and online risks. Parents of children with “digital autism” were more frequently represented in the mixed or inconsistent pattern (51.1% vs. 33.8%) and less often in the active/enabling pattern (16.3% vs. 29.6%; $\chi^2(2) = 9.04$; $p = 0.011$).

Table 3

Patterns of parental mediation by child’s status

Mediation pattern	“Digital autism” group, %	Comparison group, %	Total sample, %
Primarily restrictive	32.6	36.8	34.5
Mixed/inconsistent	51.1	33.8	42.9
Active / enabling	16.3	29.6	22.6

The intervention comprised four modular sessions (group training, home-based practical tasks, and online support) focusing on understanding screen-time recommendations and developmental needs, analysing children’s media content, strengthening co-viewing and dialogic practices, and establishing rules and routines for healthy family media use. Pre- and post-tests were completed by 30 parents in the experimental group (from both child-status categories) and 26 parents in the comparison group, who received only a brief informational leaflet.

Table 4

Pre–post changes in media literacy index by group

Group	Time point	M (SD), 0–100	Change ΔM	Significance
Experimental (n = 30)	Pre-test	56.9 (11.2)	–	–
	Post-test	71.8 (9.6)	+14.9	$p < 0.001$; Cohen’s $d \approx 1.24$
Comparison (n = 26)	Pre-test	57.8 (10.9)	–	–
	Post-test	59.3 (10.7)	+1.5	$p = .119$; $d \approx 0.13$
Group × time interaction	–	–	–	$p < 0.001$

Behavioural indicators also shifted in the experimental group. Six weeks after the programme, the proportion of parents using screens as a primary calming strategy at least once a day fell from 61.9% to 32.1% (McNemar’s $\chi^2 = 18.54$; $p < 0.001$). The share reporting regular co-viewing and discussion with the child (“often”/“very often”) increased from 27.4% to 58.3% ($p < 0.001$), and the proportion of families with clearly defined screen-time rules and “screen-free

zones" (e.g., during meals, before sleep) rose from 35.7% to 72.6% ($p < 0.001$).

In the subgroup of parents of children with "digital autism," comparable but somewhat smaller changes were observed: the use of screens for calming declined from 78.0% to 46.0% ($p < .001$), and active/enabling mediation increased from 18.0% to 44.0% ($p < .01$). Parents in this subgroup also more often reported replacing passive viewing of cartoons and short clips with brief, structured digital activities (e.g., educational apps, shared video calls with relatives) followed by offline play.

Table 5

Changes in key mediation behaviours in the experimental group

Behaviour (experimental group)	Pre, %	Post, %	Behaviour (experimental group)
Uses screens as primary calming strategy ≥ 1 time per day	61.9	32.1	Uses screens as primary calming strategy ≥ 1 time per day
Regular co-viewing and discussion ("often/very often")	27.4	58.3	Regular co-viewing and discussion ("often/very often")
Clear rules on screen time and "screen-free zones" at home	35.7	72.6	Clear rules on screen time and "screen-free zones" at home
Subgroup: parents of children with "digital autism" (n = ?)			Subgroup: parents of children with "digital autism" (n = ?)
Uses screens for calming "often/very often."	78.0	46.0	Uses screens for calming "often/very often."
Active/enabling mediation pattern	18.0	44.0	Active/enabling mediation pattern

At baseline, only 23.8% of parents were familiar with the term "digital autism," and fewer than 10% could explain it in a way consistent with scientific and clinical discussions. After the intervention, 74.0% of parents in the experimental group correctly distinguished clinically diagnosed ASD from autism-like symptoms linked to excessive passive screen time, while also recognizing that developmental difficulties cannot be attributed to "gadgets alone".

Qualitative feedback from brief open-ended questions indicated that parents began to link risks not only to the amount of screen time but also to the quality of interaction around media; many participants evaluated their own smartphone habits as a key model for children; and some parents of children with "digital autism" reported fewer episodes of emotional withdrawal during family routines after introducing more predictable and interactive media use.

Overall, the findings suggest that a structured, culturally adapted media-education programme can substantially strengthen parental media literacy and facilitate a shift from inconsistent or predominantly restrictive mediation toward more active and reflective guidance. For families raising children with "digital autism," such programmes appear to help move from compensatory overuse of screens to more balanced, developmentally informed digital practices.

Discussion. The study explored whether a targeted media-education programme could enhance parental media literacy and modify family media practices in households where young children, including those with "digital autism," are intensively exposed to screens. The results suggest that parental competencies and routines are both problematic and malleable: baseline mediation patterns were suboptimal, yet even a brief, structured intervention yielded meaningful cognitive and behavioural changes.

First, the findings show that parental media literacy is developed unevenly. In this sample, parents scored relatively high on basic technical skills but markedly lower on critical evaluation of content and on understanding commercial and algorithmic influences. This imbalance aligns with international evidence suggesting that many parents feel confident using devices yet lack analytic tools to grasp how platforms shape children's attention, emotions, and values (Hobbs, 2011; Livingstone & Helsper, 2008). For young children, such a gap is especially consequential: choices about what children watch and for how long are made with limited awareness of hidden persuasive mechanisms or developmental needs.

A central contribution of this study is the comparison between families raising children with "digital autism" and those without developmental diagnoses. Although the groups did not differ on the overall media literacy index, they displayed different profiles of everyday practices. Parents in the "digital autism" group relied more often on screens as a primary calming strategy, engaged less in co-viewing and dialogue, and scored lower in critical appraisal of child-directed content. This pattern suggests not general skills "deficit," but a specific mediation style in which digital devices are used to regulate behaviour and manage emotional crises. In contexts of sensory overload, communication difficulties, and elevated parental stress, screens become a fast and seemingly effective means of de-escalation while reinforcing passivity and reducing live interaction. Similar dynamics have been noted in clinical and psycho-pedagogical discussions of excessive early screen exposure and its association with autism-like symptoms (Hill & Council on Communications and Media, 2016; Kardaras, 2016).

The mediation typology identified here, primarily restrictive, mixed/inconsistent, and active/enabling, largely corresponds to classifications reported in earlier studies (Livingstone et al., 2017; Nikken & Schols, 2015). In this study, however, mixed or inconsistent mediation was the most common pattern, particularly among parents of children with "digital autism." This result is theoretically significant: it suggests that the central issue is not simply excessive permissiveness or strictness, but oscillation between strategies in the absence of a coherent framework and stable rules. Devices may be banned at times, used as rewards or pacifiers in others, and occasionally left unmonitored. Under these conditions, children receive mixed signals, and media use becomes a site of negotiation and conflict rather than a structured developmental resource.

The intervention outcomes show that parental media literacy can be improved even through a brief four-session programme. The substantial increase in the media literacy index in the experimental group, alongside only minor change in the comparison group, suggests that the combined format of psycho-educational input, joint analysis of concrete media examples, and practical homework was effective. Especially notable were gains in components that are often most difficult to influence: critical reading of media messages, awareness of commercial and algorithmic mechanisms, and confidence in setting privacy and safety controls. These changes support the view that media literacy is not limited to "time limits," but involves understanding how digital ecosystems operate and how children navigate them (Hobbs, 2010; Chelysheva, 2008).

Behavioural changes in family media routines were also substantial. Six weeks after the programme, parents in the experimental group reported less frequent use of screens as a primary calming tool, more co-viewing and discussion with children, and clearer rules regarding "screen-free zones" and screen-free times at home. In families raising children with "digital autism", the move from passive background viewing to brief, structured, interactive activities followed by offline play suggests a shift from compensatory overuse to more deliberate, goal-oriented digital practices. These changes align with recommendations in the literature on digital

participation of children with ASD, which stress balancing risk reduction with meaningful, supported engagement (Pliska et al., 2023).

Another noteworthy outcome was a shift in how parents conceptualized "digital autism." At baseline, only a small minority had heard the term, and most linked it to alarmist media narratives. After the programme, a substantial proportion of parents could distinguish clinically diagnosed ASD from autism-like symptoms associated with excessive passive screen time, while acknowledging both the role of devices and the broader biopsychosocial context. This more nuanced understanding is important: simplistic "screen-blaming" can stigmatize families and divert attention from comprehensive developmental support, whereas informed media literacy helps parents view digital technologies as both a potential risk and a resource to be integrated thoughtfully into individualized support plans.

From a Kazakhstani perspective, the study indicates that parental media literacy is still underdeveloped but represents a highly promising domain for preventive work. Current initiatives in Kazakhstan and the wider region have tended to prioritize adolescents, misinformation, and civic resilience, whereas the needs of parents of young children, particularly those raising children with ASD or "digital autism," have received far less attention. The findings suggest that embedding media-education modules into preschool and school settings, as well as into psychological and pedagogical support services, is both feasible and potentially impactful. Such an approach could also connect two policy strands that are often treated separately: digital safety and inclusive/special education.

Several limitations should be noted. First, the sample was small (56 parents) and likely biased toward more motivated, urban, and better-educated families, which restricts generalizability. Future research should recruit larger and more diverse samples, including rural and socio-economically disadvantaged groups, where digital inequalities and stress may be greater. Second, media use and mediation practices were measured via self-report, making the data vulnerable to social desirability and recall biases; combining questionnaires with digital logs, observations, or time-use diaries would yield a more accurate picture of behaviour. Third, follow-up was limited to six weeks, so it is unclear whether gains in media literacy and family routines persist over time and under everyday pressures; longitudinal designs with multiple follow-ups are needed. Finally, the quasi-experimental design without random assignment cannot fully rule out selection effects, and randomized controlled trials would strengthen causal inference.

Despite these constraints, the study has practical and theoretical implications. It suggests that:

– programmes that address parents' beliefs, stress, and personal media habits may be more effective than purely informational "screen time" campaigns;

– support for families of children with "digital autism" should explicitly combine guidance on healthy media routines with help in developing alternative avenues for communication, play, and emotional regulation;

– parental media literacy may function as a protective factor, moderating the link between children's screen exposure and developmental risks.

In conclusion, the results support moving from a deficit-oriented view of parents framed mainly as sources of "wrong" screen practices to a competence-based perspective in which parents act as reflective mediators of their children's digital experiences. Strengthening parental media literacy in this way not only reduces potentially harmful patterns of screen use but also contributes to more responsive, inclusive, and developmentally informed family practices.

Conclusion. Parental media literacy in families with young children, including those raising children with ASD and "digital

autism," was generally at a medium level and showed a marked imbalance: parents reported greater confidence in technical skills than in critically evaluating children's content and understanding commercial and algorithmic influences. This gap increases the risk of poorly informed decisions about children's screen use. Families of children with "digital autism" showed a distinct mediation profile despite similar overall media literacy: more frequent use of screens for calming, less co-viewing and dialogue, and lower critical appraisal of child-directed content. As a result, devices often serve as behavioral and emotional regulators, reducing live interaction precisely when structured support is most needed.

The four-session Programme improved both knowledge and practices. Participants increased their media literacy index, with the largest gains in critical reading, awareness of persuasive and algorithmic mechanisms, and confidence in privacy and safety settings. Reported routines also changed: parents relied less on screens for calming, engaged more in co-viewing and discussion, and established clearer family rules; in the "digital autism" subgroup, passive viewing was more often replaced by brief, structured, interactive digital activities integrated into daily routines. Overall, parental media literacy appears to be a modifiable protective factor. Embedding media-education modules in early childhood support, inclusive education, and counselling services may help families shift from inconsistent or mainly restrictive mediation toward more active and reflective guidance.

The study is limited by a modest sample, reliance on self-report, and a short follow-up; future research should use larger samples, objective indicators of media use, and longer-term assessment. Ethical principles were observed, including informed consent, voluntary participation, anonymity, and the right to withdraw.

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Original Article
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Development of National Consciousness of Students by Means of Kazakh Drama: A Pedagogical Experience

Abstract

Introduction. National values constitute the foundation of the spiritual and moral development of the younger generation. In the context of globalization, the problem of forming students' national identity through Kazakh drama in literature reading lessons becomes increasingly relevant. *Methodology and Methods*. A pedagogical experiment was conducted with control and experimental groups of eighth-grade students. The experimental group was taught using drama-pedagogical methods: analysis of dramatic works, dramatization of dialogues, creative assignments, and group discussions. The control group followed traditional teaching methods. Quantitative data, including tests and assessment tasks, and qualitative data, including group discussions, dramatizations, and reflective notes, were collected and analyzed using statistical methods and thematic coding. *Results*. The experimental group demonstrated a substantial improvement in performance compared to the control group. Students in the experimental group developed a deeper understanding of the characters, were able to articulate patriotic principles more effectively, and established meaningful connections between national values and their personal experiences. In addition, student engagement increased considerably in the experimental group, while only a modest improvement was observed in the control group. *Scientific Novelty*. It has been established that the integration of drama-pedagogical methods transforms the traditional teaching model into a holistic cycle of "reading-experiencing-expressing-analyzing". It has been proven that Kazakh drama functions as an integrative tool for forming national consciousness, cultural identity, and patriotic feelings while simultaneously developing students' creative thinking and analytical abilities. *Practical Significance*. The developed methodology provides practical recommendations for implementing national dramatic works into the literature reading curriculum. Structured lesson plans using dramatization, role-playing, and group discussions significantly deepen understanding of the national idea and increase interest in cultural values.

Keywords: national idea, literature classes, student engagement, analytical skills, cultural values, innovative methods.

Introduction. National values represent a fundamental basis for the spiritual and moral development of the younger generation. In the context of globalization, when youth are exposed to the influence of heterogeneous cultural flows and informational impacts, the problem of forming a stable national identity among schoolchildren acquires particular relevance. Kazakhstan, possessing rich historical heritage and a distinctive culture, is in the process of actively reconceptualizing its

spiritual foundations and searching for effective mechanisms for forming national consciousness among students (Ministry of Education of the Republic of Kazakhstan, 2025).

The "Ruhani Zhangyru" program (Kumyspaev, 2019), initiated in 2017, emphasizes the need to modernize public consciousness while preserving national identity and cultural code. In this context, school education acquires strategic significance as an institution forming the spiritual and moral foundations of personality, rooted in national culture and traditions. Middle school represents a critically important stage in personality formation, when basic value orientations are laid down, and a child's worldview and cultural identity are formed.

The national values of Kazakhstan (Safargalieva, 2024) include respect for history and cultural heritage, patriotism, interethnic tolerance and harmony, collectivism and mutual assistance, hospitality, respect for elders and veneration of ancestors, striving for knowledge and education, diligence, and purposefulness. These values were historically shaped within the context of nomadic civilization, reflecting the distinctive features of the Kazakh worldview. The oral tradition, embodied in epic heritage and the aphoristic wisdom of biys (traditional judges and orators) and akyns (poet-improvisers who performed with the dombra), served as a repository of cultural memory and a mechanism for intergenerational transmission of values. The contemporary school is tasked with perpetuating this tradition through pedagogically adapted forms and methods of instruction.

Literary reading lessons (Khasenova, 2024) occupy a special place in the system of transmitting national values in middle school. Fiction, being a form of cultural memory, accumulates the spiritual experience of the people, their ethical norms, aesthetic ideals, and worldview orientations (Eagleton, 2011). Through literary works, not only is information about historical events or social phenomena transmitted, but also emotional experience and moral models that shape a child's spiritual world. In early and middle school age, literature serves as one of the main means of socialization, forming ideas about good and evil, justice and dignity, duty and responsibility.

Among literary genres, drama possesses special pedagogical potential for work with middle school students. Dramatic works, based on dialogue, conflict, and action, create unique conditions for empathy, emotional involvement, and active participation of schoolchildren in the educational process (Nicholson, 2011). Unlike epic and lyrical genres, drama presupposes direct action and live interaction of characters, which makes it especially accessible and attractive for children's perception. Dramatic text is initially oriented toward stage embodiment, toward dialogue, toward creating a space for collective experience.

As Bolton and Heathcote (1999) note, drama allows students not merely to read text, but to live through situations, make decisions on behalf of characters, and reflect on moral dilemmas. Drama creates a space for role-playing experimentation, where schoolchildren can explore different behavioral models and value positions in a safe educational environment. Through identification with characters and through experiencing dramatic situations, not only intellectual but also emotional cognition occurs, developing the capacity for empathy and understanding of human relationships and social processes. For children of middle school age, who are in an active phase of socialization and formation of their own identity, such an experience is especially valuable.

Kazakh drama (Mukan, 2016) provides rich material for forming national values in literary reading lessons. Works by Kazakh playwrights reflect traditional virtues of the Kazakh people: wisdom, justice, dignity, hospitality, loyalty to one's word and duty, and respect for elders. Dramatic texts present heroes embodying national ideals, historical events that shaped national consciousness,

and social conflicts requiring moral choice. Through familiarization with these works, schoolchildren gain the opportunity to engage with national culture and realize their belonging to a people with a rich history and spiritual traditions.

Dramatic works in the Kazakh language or translated into Russian may include texts adapted for children's perception, based on folklore plots, historical legends, and heroic epics. They tell of batyrs who defended their native land, of wise biys who resolved disputes justly, of ordinary people who demonstrated resilience and dignity in difficult circumstances. Such works not only familiarize children with national history and culture, but also form moral guidelines and ideas about heroism, justice, and honor that are relevant for any era.

Despite its obvious educational potential, Kazakh drama is insufficiently represented in literary reading lessons in middle school. Literary reading programs traditionally focus on the study of fairy tales, stories, and poems, while minimal attention is devoted to drama. Traditional teaching methods are often limited to reading text and retelling, not fully utilizing the possibilities of drama for interactive and activity-based learning (Gallagher, 2007). Meanwhile, the specificity of the dramatic genre requires completely different forms of work: reading by roles, theatricalization, dramatic exercises, and discussion of characters' actions.

The use of drama in literary reading lessons (Khasenova, 2024) opens up wide possibilities for applying interactive teaching methods, especially effective in working with middle school-age children. Reading by roles develops expressive speech and the ability to convey characters' emotions through intonation. Theatricalization of fragments of dramatic works contributes to a deeper understanding of characters' and heroes' behavioral motives and develops creative imagination and communication skills. Discussion of moral dilemmas faced by characters forms the capacity for moral judgment, for distinguishing good from evil, and for understanding the consequences of choice.

Moreover, working with dramatic text naturally creates conditions for collective activity, which corresponds to the age characteristics of schoolchildren and the traditional Kazakh value of collectivism. Preparing a theatrical performance requires distribution of roles, coordination of actions, and mutual support-all of this develops social skills, the ability to cooperate, and a sense of responsibility to the collective. Public performance before classmates or parents promotes the development of self-confidence, overcoming shyness, and the formation of positive self-esteem.

Particular value lies in the opportunity provided by drama to facilitate familiarity of schoolchildren with the Kazakh language and with cultural traditions of Kazakhstan through a lively and emotionally rich form. Even for children for whom Kazakh is not their native language, participation in staging a dramatic work in Kazakh or using Kazakh words and expressions can become an engaging experience of engagement with national culture. Dramatic text, saturated with dialogues, provides excellent material for mastering conversational speech, intonational features of the language, and etiquette formulas of communication characteristic of Kazakh communicative culture.

Thus, the relevance of this research is determined by the need to develop scientifically grounded approaches to using Kazakh drama as a means of forming national values in literary reading lessons in middle school. A reconceptualization of the place and role of drama in curricula is required, along with the development of methodological techniques for working with dramatic texts, adapted to the age characteristics of schoolchildren and oriented toward forming national identity, moral qualities, and cultural competence. The integration of Kazakh drama into literary reading lessons using interactive, creative, and game-based teaching methods can become an effective mechanism for transmitting spiritual heritage, cultivating patriotism, and developing

cultural consciousness in Kazakhstan's younger generation.

Literature Review. Analysis of scientific research and pedagogical practice demonstrates that dramatic works and drama pedagogy methods in literary reading lessons in middle school contribute not only to the development of reading and text analysis skills, but also to the formation of cultural identity, social competencies, aesthetic perception, and students' emotional intelligence.

International pedagogical experience convincingly demonstrates the educational potential of dramatic methods in school education. Researchers identify several directions of drama pedagogy: creative drama, process drama, and theatre in education. Each of these directions has proven its effectiveness in developing schoolchildren's communicative, creative, and critical abilities (Nicholson, 2011). It is especially important that dramatic methods form in children the ability to work in a collective, express their thoughts and feelings, and understand other people's positions.

Bolton and Heathcote (1999) emphasize that the perception and application of drama varies among educators. Some teachers view drama primarily as a theatrical performance oriented toward an audience. Other educators see its value in the ability to activate schoolchildren's cognitive activity, deepen understanding of educational material, and improve language skills through living interaction with text.

Dramatic methods are also effective for developing students' written speech. When schoolchildren participate in dramatization, they more deeply comprehend the content of a work, assimilate language constructions characteristic of a particular genre or style, and enrich their vocabulary. By living through a situation from a character's perspective, a child better understands their motives and emotions, which subsequently is reflected in their own written works, compositions, presentations, and creative texts.

These observations show the multifaceted influence of drama pedagogy, which stimulates not only linguistic but also cognitive, emotional, and social development of children. However, the inclusion of dramatic works, especially national drama, in school literary reading programs faces certain difficulties. In Kazakhstan schools, drama is studied episodically: the main attention in literary reading lessons is devoted to stories, fairy tales, and poems, while dramatic works are insufficiently represented.

Moreover, the theoretical and methodological foundations of teaching drama in middle school remain understudied. Existing methodological developments are often limited to describing the genre features of drama or analyzing the content of specific works, but do not offer concrete pedagogical technologies for working with children of different ages.

The specificity of a dramatic work lies in the fact that it is initially intended for stage embodiment: its meaning is revealed through dialogue, action, character interaction, and conflict. Therefore, it is insufficient to simply read a dramatic text like an ordinary story. For schoolchildren, especially of primary and middle school age, it is important to experience the work through dramatization, role-playing games, theatrical exercises, and discussion of heroes' actions. This approach transforms children from passive listeners into active participants in the educational process (Gallagher, 2007).

Drama, by its nature, represents an act of transmitting meaning that actively engages schoolchildren in learning. Participating in dramatization, children engage in dialogues and situations that stimulate imagination and require the use of expressive speech means. When such activities are methodologically competently organized, they evoke genuine interest in students, contribute to natural and deep language acquisition, and develop empathy and social skills (Angelianawati, 2019).

Educators emphasize the necessity of clearly defining didactic goals when studying dramatic works. Among such goals are:

improvement of expressive reading skills, development of artistic text analysis, aesthetic education, formation of cultural consciousness, understanding of social and moral values, and development of communication skills through speech, facial expressions, and movement.

Particular significance for schools in Kazakhstan concerns the historical development of Kazakh drama, including national thematic orientations as well as distinctive stylistic and cultural characteristics. Kazakh drama emerged in the early 20th century, during the period of national literature's formation. The first Kazakh plays were oriented toward enlightening and socially significant themes, striving to reflect the people's values, their social conditions, and spiritual aspirations.

This historical and cultural context allows for the formation of national consciousness, cultural identity, and patriotic feelings in schoolchildren through literary reading lessons. The thematic richness of dramatic works, addressing the people's history, questions of morality, justice, and human dignity, contributes to shaping children's worldview, their emotional responsiveness, and moral guidelines.

At the same time, systematization of the methodology for teaching drama in literary reading lessons is associated with a number of pedagogical and organizational problems. First of all, the teacher's readiness to apply dramatic methods is important. Drama is not simply text; it is a synthesis of word, action, emotion, and image. Consequently, the professional competence of the educator, their knowledge of drama theory, mastery of theatricalization methods, and ability to create a creative atmosphere in the classroom acquire paramount importance. This requires special methodological training of teachers (Dawood, 2024).

Secondly, in existing curricula and plans, limited space is allocated to dramatic genres, especially Kazakh drama. This reduces opportunities for dramatic activities in literary reading lessons and makes it difficult to fully realize the educational, patriotic, and aesthetic potential of dramatic works.

Thirdly, careful selection of dramatic material in accordance with age characteristics and schoolchildren's level of perception is necessary. This concerns not only the artistic quality and linguistic complexity of the text, but also thematic content, the nature of conflicts, and emotional intensity. Dramatic works may touch upon complex life problems, moral dilemmas, and historically sensitive themes; their study requires methodological and psychological caution.

Drama creates a dynamic environment for natural language use, which improves children's social skills, increases their motivation and engagement, and ultimately leads to more solid learning outcomes. In studying folk and national cultural values, dramatic methods and works of national drama play a significant role in developing schoolchildren's cultural identification, national consciousness, spiritual roots, and historical awareness. This corresponds to the humanistic and cultural-historical goals of education.

Thus, the literature review shows that dramatic works and drama pedagogy methods are effective tools for enriching literary reading lessons in middle school. They provide a modern, interactive, student-centered approach that promotes the development of students' linguistic, literary, aesthetic, emotional, social, and cultural skills. Moreover, national drama represents not only an artistic form, but also the socio-historical and cultural heritage of the people, serving as a means of forming national consciousness and children's personal development.

Nevertheless, a lack of systematic research devoted to the integration of drama into school literary education is noted. Most existing works are descriptive in nature; these are methodological developments of individual lessons, analysis of works' content, while comprehensive methodological and empirical studies, interdisciplinary integration, and assessment of the long-term

impact of drama pedagogy on students' development remain rare. This represents a significant gap for future research.

The present study represents an important contribution aimed at an in-depth analysis of teaching the national idea through Kazakh drama in literary reading lessons, developing methodological foundations, proposing practical approaches, and studying educational needs. Such research contributes to preserving Kazakh identity, language, literature, and culture, and forming the national consciousness of the younger generation.

Overall, the literature review demonstrates that teaching drama in middle school corresponds to contemporary educational paradigms, promotes holistic development of students, and transmits cultural and personal values to the young generation. However, the effectiveness of this process depends on methodologically competent organization of instruction, professional training of teachers, and adaptation of educational materials and programs to the age characteristics of schoolchildren (Luo et al., 2024).

In the future, experimental research, pilot projects, meta-analysis, long-term observations, and assessment of indicators of students' socio-ethical development can help establish drama as an integrative tool of literary and cultural education in Kazakhstan's middle schools.

Materials and Methods. The methodological framework of this study was designed in a quasi-experimental format with comparative analysis of two groups and was aimed at the systematic integration of national ideas through Kazakh drama in literature instruction. The study was implemented through a mixed-methods approach combining quantitative and qualitative data collection and analysis methods for a comprehensive evaluation of students' educational outcomes, including their creative abilities, analytical skills, and development of national consciousness.

Data Collection Tools. Academic grades, standardized assessment tasks, structured questionnaires, and analytical rubrics were employed for quantitative data collection. The qualitative component of the study included focused group discussions in the classroom, role-playing and theatrical performances, field observations and instructor notes, as well as students' self-reflective essays. The selection of narrative inquiry as the primary qualitative method was justified by its methodological relevance for studying educational practices in dramatic instruction, as noted by Shu (2024), since this approach allowed for the integration of various research instruments to understand the contribution of drama to moral education and required critical analysis of pedagogical decisions, instructor's emotional responses, sociocultural positioning, and theatrical procedures in the educational context.

Participants. The study participants were eighth-grade students, whose selection was justified by the fact that at this stage of cognitive development, students demonstrate enhanced capacity for complex literary analysis, a sufficient level of linguistic maturity, and readiness for conscious acquisition of patriotic values. The sample was divided into two groups: the experimental group received instruction through a specially designed pedagogical program emphasizing national themes and the cultural significance of Kazakh drama, while the control group was taught using traditional methodology, including text reading, answering questions, interpretive exercises, and summary assignments, as described by Putri et al. (2025).

Procedure. The pedagogical program for the experimental group was structured to include textual analysis of dramatic works, role distribution and dramatization, dialogue performance, creative writing assignments, and collaborative discussions. The instructional sequence was pre-designed with a clear definition of learning objectives, pedagogical techniques, student activities, and assessment criteria for each lesson. Digital presentation tools, visual and audio learning materials, web platforms, and creative writing exercises were employed to

enhance motivation and active student engagement. The traditional approach in the control group consisted predominantly of text reading, oral responses to questions, interpretive exercises, and written summary assignments, which provided limited opportunities for dramatization or collaborative discussion.

Data Analysis Technique. Diagnostic testing at the initial stage and summative testing upon program completion were employed to assess the effectiveness of the pedagogical intervention, along with criterion-based assessment of such parameters as student participation, motivation intensity, depth of understanding, and creative potential. Statistical processing of quantitative data was conducted using specialized software, including calculations of mean academic performance indicators, variability measures, and trajectories of educational outcome development. Qualitative data were processed using thematic coding methodology, which involved identifying central conceptual categories, recognizing recurring motifs, and determining emerging trends through systematic analysis of instructor documentation, discussion records, and learning activity artifacts. This methodological strategy facilitated a comprehensive representation of pedagogical outcomes and enabled a holistic assessment of the depth of students' understanding of national principles and their personal adoption.

Results. Comparative analysis of pre- and post-testing results revealed statistically significant differences between the groups. As illustrated in Table 1, in the experimental group, the mean score increased from fifty-eight to eighty-two, representing a forty-one percent gain, whereas in the control group, the gain was only ten percent, as the mean score rose from fifty-seven to sixty-three. The obtained data convincingly demonstrated the high effectiveness of the developed pedagogical methodology.

Table 1

Comparison of Pre-test and Post-test Results Between Treatment and Comparison Cohorts

Group	Pre-test (Mean)	Post-test (Mean)	Growth Rate (%)
Experimental Group	58	82	41
Control Group	57	63	10

Criterion-based assessment also revealed substantial positive dynamics in the experimental group across all measured parameters. Specifically, participation indicators increased from four point five to eight point three on a ten-point scale, whereas in the control group, minimal growth was observed from four point three to five point one. These indicators demonstrated the effectiveness of the applied instructional approaches.

Quantitative analysis of creative written work and collaborative discussions revealed significant improvements in students' understanding of character development, identification of national themes, conflict interpretation, and creative analysis skills. Some students achieved a deep understanding of behavioral patterns and emotional states of dramatic characters during theatrical productions and successfully articulated patriotic principles through specific examples from Kazakh dramatic works.

The comparison group, in which conventional teaching methods were employed, was characterized by a predominance of reproductive forms of learning. Students' cognitive activity was limited to reading literary texts and completing question-and-answer tasks. Opportunities for performance-based activities and collective interpretation of the material were virtually absent. This approach resulted in superficial acquisition of the civic and patriotic content of the works and a poorly developed ability to relate literary material to personal life experience. The lack of activity-based learning negatively affected both the depth of aesthetic engagement and overall motivation to learn.

The experimental group demonstrated a qualitatively different picture. Interactive and

creative forms of content acquisition occupied a central place in this group's learning process. Stage work and creative assignments facilitated emotional immersion in the artistic world of the works. Students learned to empathize with characters and to experience the situations portrayed in the plays, which substantially deepened their understanding of the texts' ideological content. Group discussions and role-play exercises contributed to the development of communicative competence. Participants acquired skills in reasoned argumentation and learned to articulate their own positions clearly regarding literary works and the value orientations embedded within them.

Digital educational resources-visualization of dramatic episodes, video interpretations, and audio materials-engaged multiple channels of information perception. This enhanced concentration and accelerated mastery of the curriculum content. The written reflective works produced by participants in the experimental group are of particular value. Analysis of these tests revealed that students were capable not only of recognizing civic and patriotic ideas in dramatic literature but also of comprehending their significance for their own cultural identity. The establishment of connections between artistic content and personal experience indicates the achievement of a key objective of the pedagogical intervention-the formation of a conscious attitude toward national values. Thus, qualitative analysis of the collected data confirmed the effectiveness of the activity-based approach to studying drama within the context of civic and patriotic education.

Ethical standards for research involving human participants were observed at all stages of the study. All research participants received complete information about the study's objectives, procedures, and expected outcomes; voluntary informed consent was obtained from both students and their legal guardians; and confidentiality of personal data was ensured through appropriate information protection protocols, including the use of coded identifiers instead of participants' names in data processing and presentation.

Thus, the results of the conducted study convincingly demonstrated that the implementation of interactive, digital, and performance-oriented pedagogical methodologies for transmitting national concepts through Kazakh drama substantially enhanced students' academic performance, developed creative abilities and analytical competencies, and promoted deep understanding and personal adoption of patriotic values. The synthesis of quantitative data with qualitative analysis results provided reliable confirmation of the effectiveness of the developed pedagogical methodology and allowed the conclusion that these pedagogical approaches position literature education as a contemporary, student-centered instrument for forming cultural and national identity within the context of the Kazakhstan educational system.

Discussion. The results obtained during the study convincingly demonstrate that the application of performative methodologies and pedagogical strategies of active participation in literature teaching significantly deepens students' comprehension of patriotic values, stimulates the development of creative and critical thinking, and enhances academic motivation. The findings are corroborated by international and regional scholarly publications, which note the high effectiveness of theatrical educational practices in forming linguistic, cognitive, and social-communicative competencies in the process of philological education (Shah, 2024).

In the experimental group, students immersed themselves in literary works through practical engagement with theatrical arts: they embodied characters, participated in staging activities, and engaged in spontaneous verbal interaction with one another. The experimental results, that is, the direct intervention with the sample, demonstrated that dramatic methods function not only as a means of interpreting literary material but also as an effective pedagogical mechanism for developing civic consciousness and a

sense of belonging to national culture. The findings are consistent with conclusions from previous scholarly works that substantiate the educational value of activity-based forms of learning, viewing verbal art as a means of personal self-determination that fosters cultural, social, and moral-spiritual development of the younger generation.

The integration of theatrical components into literary education fundamentally reconfigures the instructional process, transforming it into a dynamic, constructivist, and student-centered educational environment. The traditional linear model of reading interpretation, written reflection, is replaced by a multi-level pedagogical architecture of reading–emotional experiencing, expressive embodiment, and reflective analysis. The methodological configuration activates students' creative self-realization, individualized meaning-making, collective interpretive practice, and affective immersion in literary material. International scholarly reviews document the productivity of process-oriented theatrical methodologies not only in the sphere of foreign language education, but also across a broad spectrum of literary and humanities disciplines.

The implementation of experimental pedagogical intervention contributed to the substantial expansion of students' understanding of patriotic imperatives, historical-cultural determinants of national identity, ethical dilemmas, and social problematics. Work with dramaturgical texts and performative activity ensured perception of the studied content not as discrete informational units, but as holistic existential phenomena rooted in authentic national and human experience. Such perception is fundamentally important for consolidating cultural-ethnic self-awareness, a sense of national belonging, and awareness of the continuum between traditional cultural heritage and contemporary sociocultural reality. Interdisciplinary performative pedagogical practices in previous scholarly works demonstrated analogous effectiveness across various educational systems.

It is necessary to note that the specificity of the present study, focused on Kazakh dramaturgical tradition, the Kazakhstan system of literary education, and the formation of national consciousness, determines its methodological uniqueness relative to global pedagogical practices. Hermeneutic work with national dramatic works and their theatrical embodiment creates conditions for organic integration of literary education with processes of cultural socialization in educational institutions of Kazakhstan. The pedagogical strategy transcends the boundaries of conventional language instruction, encompassing tasks of preservation, actualization, and transgenerational transmission of national cultural heritage (Pham & Nguyen, 2024).

Simultaneously, numerous challenges were identified during the research implementation, typical of implementing performative-oriented methodologies into educational practice. The problem of professional competence and methodological preparedness of educators holds paramount importance. Theatrical pedagogy requires not only philological qualification, but also mastery of directorial techniques, skills in emotional facilitation, methods of working with character development, organization of collective creativity, and stimulation of creative imagination, which presupposes developed organizational and psychological-pedagogical abilities alongside dramaturgical erudition. International research documents that the professional identity of educators evolves in the process of mastering such practices; however, this represents a prolonged trajectory of professional development requiring systemic institutional support.

The problem of literary material selection also plays a significant role. The artistic complexity, thematic richness, linguostylistic characteristics, and historical-cultural contexts of national dramatic works must correlate with the age-appropriate and psychological capacities of students. Dramaturgical texts frequently contain problematic social-historical narratives and

emotionally intense content, which requires delicate pedagogical guidance, competent facilitation, and creation of conditions for reflective processing.

Additionally, organizational resource limitations of the educational process must be considered. Implementation of theatrical practices, stage productions, role distribution, and collective creative projects requires significant time expenditure, adequate spatial conditions, material-technical provision, and appropriate infrastructure. In conditions of formal education, especially in Kazakhstan educational institutions with limited resources, reconciling the theoretical content of curricula with practical performative forms of work may present considerable organizational difficulties (Tuveri et al., 2024).

It is of considerable importance to recognize that the study of national drama extends beyond the objectives of artistic development, touching upon fundamental worldview, sociocultural, and moral dimensions. The successful transmission of patriotic meanings, collective historical memory, and ethnocultural values embedded in plays requires a methodologically sound, balanced, and analytically structured approach to teaching. Teachers must work with texts competently and reflectively, ensuring that dramatic content is interpreted in accordance with its aesthetic complexity and cultural-historical significance.

Considering the polysemantic nature of dramaturgical texts and the multiplicity of possible interpretations, it is essential to create an educational atmosphere in which dialogicity, reflexivity, reasoned discussion, and critical analysis constitute integral components of the instructional process. Such a pedagogical orientation stimulates students toward profound comprehension of transmitted cultural-ethical ideas, development of analytical capabilities, and formation of complex, critically grounded conceptions of their own national identity and historical past.

Overall, the conducted research and its scholarly validation demonstrate that performative-oriented methodologies and theatrical pedagogical practices provide a solid scientific-methodological foundation for transmitting patriotic concepts within the framework of Kazakh literature instruction. Components of active participation, creative self-realization, cultural inculturation, and individualization of educational trajectories contribute to the holistic development of students' personalities. Successful implementation of these methodologies is conditioned by systematic professional preparation of pedagogical personnel, quality curation of educational content, effective organizational structures, adequate resource provision, and high ethical-cultural reflexivity of educational process participants (Falcon & Leon, 2024).

Prospective research in the field should be conducted through prolonged longitudinal observations, multidimensional assessment of the dynamics of students' cultural-ethnic self-awareness, trajectories of personal development, formation of social-moral orientations, development of creative potential, and methodological validation of pedagogical instruments. Integration of contemporary media technologies, digital educational content, virtual and augmented realities, and multimedia tools into performative-oriented instruction opens additional research and practical horizons.

Consequently, pedagogical work with patriotic concepts through Kazakh dramaturgy within the framework of literary education represents a significant and promising direction in the contemporary educational paradigm. The approach constitutes an innovative configuration of humanities, cultural, social, and spiritual-moral education that substantially expands the traditional boundaries of language and literary instruction. With systematic and methodologically grounded implementation, it can function as an effective mechanism for revitalizing national consciousness, actualizing cultural heritage, and mobilizing creative potential in educational and sociocultural spaces (Churio-Acevedo, 2024).

Conclusion. The conducted study established that Kazakh dramaturgy represents an exceptionally productive pedagogical resource for forming national consciousness among eighth-grade students. Analysis of empirical data demonstrated that works of Kazakh drama, embodying historical memory, cultural traditions, and ethical values of the people, when engaged with performatively, yield qualitatively different educational outcomes compared to traditional methods of literature instruction. Quantitative indicators of academic performance in the experimental group increased by forty-one percent, which is four times higher than the dynamics in the control group, while qualitative analysis revealed the formation of students' capacity for deep cultural reflection and conscious appropriation of national values.

The key factor of effectiveness was precisely the specificity of Kazakh dramatic works, which, through conflicts, characters, and plot collisions, transmit the quintessence of national experience and worldview. Theatrical embodiment of images from Kazakh dramaturgy enabled students to transition from external observation of text to internal experiencing of national meanings, which activated mechanisms of emotional identification with cultural heritage. Theatricalization of Kazakh plays transformed abstract patriotic concepts into a personally significant experience rooted in concrete dramatic situations and characters of national literature.

The study revealed that the effectiveness of Kazakh drama as an educational instrument is determined by three interrelated factors: first, the generic nature of dramaturgy, which presupposes dialogicity and performativity; second, the national substantive content of Kazakh plays, which accumulates the historical-cultural experience of the people; third, the age-specific characteristics of eighth-grade students, who possess sufficient cognitive maturity for comprehending complex cultural phenomena. The synergy of these factors created optimal conditions for transforming literature education into a space of cultural self-determination.

At the same time, practical implementation of the performative approach to Kazakh drama revealed the necessity for specialized pedagogical preparation, encompassing not only theatrical competencies but also deep mastery of national dramaturgical material, understanding of its cultural codes, and historical contexts. Selection of Kazakh dramatic texts for educational purposes requires balanced consideration of artistic merits, ideological content, and age appropriateness, which presupposes the development of specialized criteria and methodological recommendations.

The scholarly significance of the study lies in substantiating Kazakh dramaturgy as an independent pedagogical phenomenon possessing unique potential for addressing tasks of national education. The practical value lies in the approbation of a concrete methodology for utilizing Kazakh drama in the educational process and verification of its effectiveness through comparison with traditional pedagogical practices. Prospects for further research are connected with studying the differentiated impact of various generic and thematic varieties of Kazakh dramaturgy on the formation of distinct components of national consciousness, as well as with developing a typology of Kazakh dramatic works according to the criterion of their pedagogical potential for different age groups. Of particular interest is the study of possibilities for integrating classical and contemporary Kazakh drama into a unified educational trajectory that ensures understanding of the dynamics of national consciousness in historical perspective.

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Pedagogical Interpretation of Entrepreneurial Thinking in High School Students: Structure and Indicators

Abstract

Introduction. In the context of general secondary education modernization and the growing importance of socially oriented competencies, the issue of pedagogical support for entrepreneurial thinking formation in high school students becomes particularly relevant. Pedagogical science lacks clarity in interpreting this phenomenon as a pedagogical category, complicating its purposeful development and diagnosis. *Methodology and Methods*. The study employs theoretical analysis, comparative analysis, systematization, and generalization of domestic and international scholarly approaches to the conceptualization of entrepreneurial thinking as a pedagogical category. *Results.* The results define entrepreneurial thinking as a complex integrative personal characteristic encompassing motivational value, cognitive, activity-based, and reflective components that ensure student capacity for independent goal setting, proactive participation in educational and project-based activities, strategy selection, and self-evaluation. The results clarify essential characteristics of the phenomenon and identify structural components accompanied by corresponding developmental indicators. *Scientific Novelty*. A pedagogically grounded interpretation of entrepreneurial thinking as a distinct pedagogical category has been substantiated, and a structural model with corresponding diagnostic indicators has been developed and theoretically validated. *Practical Significance*. The identified patterns can be applied in organizing the educational process aimed at developing entrepreneurial thinking in high school students and in designing diagnostic tools for assessing its formation level.

Keywords: entrepreneurial thinking, high school students, pedagogical interpretation, structure, indicators, educational and project-based activity, social activity.

Introduction. The pressures of an increasingly globalized environment require Kazakhstan to move toward an entrepreneurial model of social development, where innovation serves as the main driving force. In this context, Tokayev (2025) has emphasized the importance of cultivating a new generation of entrepreneurs, stating that the discipline «Fundamentals of Entrepreneurship» must be integrated into all stages of education - from general schooling to higher education.

The State Compulsory Standard of General Secondary Education of the Republic of Kazakhstan (2022) allows us to conclude that entrepreneurial components are implicitly embedded in the target guidelines of modern school education.

According to Clause 18 of this standard, ensuring continuity in the development of students' project-based and research skills is considered one of the key principles in organizing the educational process. By its nature, project-based and research activities

involve goal setting, the search for and justification of solutions, planning, and analysis of results, which allows them to be considered a natural pedagogical environment for the development of entrepreneurial thinking.

The relevance of the identified problem is also confirmed by the introduction of the course «Technology and Entrepreneurship» in lower secondary education (grades 5-9) and the mandatory course «Fundamentals of Entrepreneurship and Business» (FEB) in grades 10-11, which demonstrates the recognition of entrepreneurial competence as a significant outcome of general secondary education. Additional evidence is provided by Tengri News (2024), which is the implementation of the 2024 National project «Talimger», carried out with the participation of the National Chamber of Entrepreneurs (NCE), higher education institutions, schools, colleges, business education experts, and opinion leaders. The initiative focuses on fostering students' entrepreneurial mindset, proactive behavior, and civic engagement, reflecting its direct relevance to the national priorities for modernizing the education system in the Republic of Kazakhstan.

Therefore, the development of entrepreneurial thinking in school students is not an additional or optional task, but logically follows from the normatively established principles of organizing the educational process.

However, it should be noted that in school practice, there is no comprehensive pedagogical model, didactic or diagnostic tools, or pedagogical mechanisms that ensure the purposeful development of students' entrepreneurial thinking, which indicates the insufficient elaboration of this area in both the theory and practice of general secondary education.

Accordingly, the formation of entrepreneurial thinking in senior secondary students should be considered a pedagogical imperative, shaped by the regulatory framework of the State Compulsory Educational Standards of the Republic of Kazakhstan, the emphasis on critical thinking development, the use of project- and research-based learning, and the expansion of entrepreneurship-oriented educational initiatives.

The research problem lies in the fact that the absence of a clear pedagogical concept and the lack of systematization of the components of entrepreneurial thinking hinder its purposeful development and diagnosis within the school educational process. Addressing this problem requires identifying the structure and indicators of entrepreneurial thinking.

Materials and Methods. The pedagogical interpretation of entrepreneurial thinking in high school students in the present study will be presented based on a critical analysis of domestic and international scientific approaches and will serve as a theoretical foundation for identifying its structure, indicators, and levels of development.

According to the model of entrepreneurial thinking developed by Davis and Dean (2016), entrepreneurial thinking is formed as a set of 14 interconnected parameters, which collectively reflect the personal and activity-related characteristics of the individual. The phenomenon of «entrepreneurial thinking» is defined as «a combination of motives, skills, and cognitive processes that contribute to achieving entrepreneurial success».

In the Entrepreneurial Mindset Profile (EMP) model, all parameters are grouped into two broad categories: entrepreneurial traits and entrepreneurial skills. These parameters were identified based on a synthesis of research findings (Cattell et al., 1970; Myers et al., 1985; Costa et al., 2000) and the development of psychometric tools designed to measure characteristics relevant to entrepreneurial activity.

The relevance of this model for secondary school students is confirmed by empirical findings (Chilenga et al., 2022), which identify entrepreneurial thinking as a key determinant of adolescents' readiness to engage in independent business activity. In that research, the authors measured the level

of entrepreneurial thinking among high school learners and examined how it affects their intentions toward self-employment. In academic literature, entrepreneurial thinking is conceptualized as a distinct mode of cognition and action (Neneh, 2012).

Therefore, findings from international research indicate that entrepreneurial thinking operates as a cognitive and behavioral resource that allows individuals to navigate uncertainty and make well-grounded decisions.

A number of Russian studies highlight the necessity and pedagogical significance of developing entrepreneurial thinking in students. The theoretical conceptualization of this category was proposed by Kopytova and Martynenko (2024), who analyzed entrepreneurial thinking as a pedagogical category and identified its key components in the context of school education. The researchers point out that « a student's entrepreneurial thinking» constitutes a holistic personal construct that integrates individual traits, competencies, and motivation for entrepreneurial engagement, and they stress that its formation should start at the school stage, with general secondary education incorporating components of entrepreneurship education.

Aksenova and Sokolskaya (2021) emphasize that the development of entrepreneurial competencies among schoolchildren involves fostering initiative, critical thinking, and the ability to make independent decisions. Grigorieva (2022) highlights the need to use practice-oriented projects to develop adolescents. Grigorieva (2022) highlights the necessity of using practice-oriented projects for entrepreneurial activity among adolescents. Troshina (2018) notes that the development of entrepreneurial thinking in high school students can be hindered in the absence of modern pedagogical approaches. At the same time, Guryanova (2023) considers the entrepreneurial class as a model that integrates theoretical knowledge, practical skills, and tangible outcomes, enabling the systematic and consistent development of entrepreneurial competencies in students. Ermakova (2024) emphasizes the role of modern technologies, including artificial intelligence, in educational programs for school students as a means of fostering entrepreneurial thinking. Gorodovich (2008) analyzes pedagogical experiments on the development of an entrepreneurial mindset in school students, confirming the effectiveness of specially designed educational programs. In the context of Kazakhstan's education system, the development of students' entrepreneurial thinking is characterized by recognizing the importance of entrepreneurship and shaping a proactive entrepreneurial outlook. The introduction of the course «Fundamentals of Entrepreneurship and Business» in schools throughout the country demonstrates that more than 4000 schools have already adopted the subject, accompanied by a steady rise in learners' interest in entrepreneurial knowledge and practical skills. This indirectly indicates the gradual development of entrepreneurial thinking in school students through the academic curriculum.

A significant methodological contribution to understanding the personal prerequisites of entrepreneurial thinking is provided by the concept of students' social activity, as presented in the research of Zhienbayeva (2008). The author defines social activity as a contemporary school student's ability to participate in age-appropriate activities aimed at addressing socially significant tasks, demonstrating initiative, responsibility, and diligence, which together ensure the achievement of socially meaningful outcomes. These qualities can be considered as the value personal foundation for the development of entrepreneurial thinking, as they reflect a student's readiness for independent choice, proactive action, and assuming responsibility for results.

Abdygapparova (2003) considers entrepreneurship in the context of innovation management, which allows for the identification of its value–motivational foundations. In the research by Ibraeva (2007), the focus is on the development of an

individual's professional potential, including initiative, decision-making ability, and readiness for professional self-development, which methodologically aligns with the objectives of forming entrepreneurial competencies. The historical and institutional prerequisites for the implementation of entrepreneurship in higher education are explored in the works of Kudysheva and Pshembaeva (2019), where the importance of comprehensive programs for developing students' entrepreneurial potential is emphasized.

The analysis of Kazakhstani research indicates that, despite the lack of a direct focus on entrepreneurial thinking in high school students, a substantial theoretical and methodological potential has been accumulated for its pedagogical interpretation. This allows entrepreneurial thinking in high school students to be regarded as an integrative personal-activity formation, based on initiative, social activity, responsibility, and readiness for practical transformation of reality.

There are a number of values that form the foundation of entrepreneurial thinking: the value of creativity, goal-setting, determination, and communicative interaction. Teaching the fundamentals of entrepreneurial activity involves deliberately organized pedagogical guidance that takes into account the patterns of mental development, age-specific characteristics, and needs of high school students. During this process, students' thinking and social activity are developed, and the prerequisites for engaging in entrepreneurial activity are established. The conducted comparative analysis shows that there is no unified approach to the interpretation of entrepreneurial thinking in domestic and international literature, and the structural components vary across different studies.

Table 1

Outlines the principal approaches, core elements, and fundamental principles applicable to the pedagogical understanding of entrepreneurial thinking in senior high school students

Author(s)	Approach / Definition	Structural Components	Key Provisions
	1. International Studies		
Davis & Dean (2016)	Entrepreneurial Thinking Model as a Set of 14 Interconnected Parameters	Personal, Cognitive, and Activity-Related Qualities	The set of parameters forms entrepreneurial thinking as a resource for decision-making in uncertain situations
Cattell et al., (1970) Myers et al., (1985) Costa & McCrae (2000)	Theoretical Basis for Assessing Personal and Cognitive Characteristics	Motivation, Cognitive Abilities, Flexibility, and Adaptability	Conceptual foundation of the entrepreneurial thinking development process
Chilenga et al., (2022)	High School Students' Entrepreneurial Thinking Development Model	Activity, Aspirations, Initiative, Readiness for Entrepreneurship	Entrepreneurial thinking as a determining factor of high school students' readiness for entrepreneurship
Neneh (2012).	Entrepreneurial Thinking as a Cognitive-Activity Phenomenon	Motivation, Decision-Making, Innovation Capacity, Confidence in Decision-Making	Implementation of realistic solutions under conditions of uncertainty
	2. Russian Studies		
Kopytova & Martynenko (2024)	Entrepreneurial Thinking as a Pedagogical Category	Motivational-Personal, Cognitive, Activity Components; Risk-Taking Propensity	School age is a sensitive period for the development of entrepreneurial thinking; the initial level in high school students is low, which necessitates the implementation of

			targeted programs
Aksenova & Sokolskaya (2021)	Entrepreneurial Thinking through the Lens of Competencies	Initiative, Critical Thinking, Ability to Make Independent Decisions	Entrepreneurial competencies are developed through project-based and research tasks; systematic pedagogical support is essential
Troshina, (2018)	Development of Creative and Entrepreneurial Thinking	Creativity, Innovativeness, Entrepreneurial Activity	The lack of developed innovative pedagogical approaches hinders the formation of entrepreneurial thinking
Guryanova, (2023)	Entrepreneurial Class as an Educational Model for Developing Entrepreneurial Thinking	Theoretical Knowledge, Practical Skills, Outcomes	Systematic integration of knowledge and practice ensures the development of entrepreneurial thinking
		3. Kazakhstani Studies	
Zhienbayeva (2008)	Students' Social Activity	Social activity as a student's ability to engage in socially significant activities	Social activity serves as the value–personal foundation of entrepreneurial thinking
Abdygapparova (2003)	Entrepreneurship in the Context of Innovation Management	Entrepreneurship as a Motivational Basis of Activity	Entrepreneurial thinking as a value-motivational disposition oriented toward initiative
Ibraeva (2007)	Professional Potential of the Individual	Initiative, Decision-Making Ability, Readiness for Self-Development	Components of professional potential reflect the cognitive and personal traits of entrepreneurial thinking
	Entrepreneurship in the Higher Education System	Importance of Comprehensive Programs for Developing Entrepreneurial Potential	A systematic approach to developing entrepreneurial thinking within the educational process

Drawing on the comparative analysis of the approaches shown in Table 1, it can be concluded that entrepreneurial thinking in senior high school students should be understood as a multi-layered cognitive–activity construct, integrating personal, motivational, and activity-oriented components. Based on these findings, the main directions for pedagogical interpretation can be identified:

1. Development of entrepreneurial competencies through project-based and research activities, as well as practice-oriented tasks;

2. Creation of an educational environment that stimulates the development of initiative, social activity, and entrepreneurial thinking;

3. Utilization of international models and theoretical approaches to assess the personal, cognitive, and activity-related components of entrepreneurial thinking.

Domestic studies emphasize the development of social activity, the ability to make independent and responsible decisions, and the practical application of knowledge through project-based and research activities. International studies highlight the importance of cognitive and personal characteristics, as well as the ability to make decisions under conditions of uncertainty. Thus, the pedagogical interpretation of entrepreneurial thinking in high school students can be presented as a systemic organization of the educational process aimed at developing: motivation for entrepreneurial activity and initiative; skills in goal-setting, problem-

solving, and justification of decisions; and the ability to integrate knowledge and personal qualities into practical activities. The pedagogical interpretation of entrepreneurial thinking in high school students allows for the integration of domestic and international experience, ensuring the holistic development of entrepreneurial thinking in students and providing a foundation for the design of pedagogical models and diagnostic tools.

In accordance with the aim of this article, the following research objective was set: the systematization and critical analysis of existing approaches to the pedagogical interpretation of entrepreneurial thinking in high school students.

The study employed several research methods, including content analysis of scientific articles, dissertations, and regulatory documents concerning the development of entrepreneurial thinking in school students; comparative analysis of theoretical frameworks regarding the structure and indicators of entrepreneurial thinking; and critical evaluation of the methodological and conceptual bases for fostering entrepreneurial thinking in educational practice.

Research Materials: Scientific articles and monographs by domestic and international authors on the topic of entrepreneurial thinking; regulatory documents and educational standards (SCSES of the Republic of Kazakhstan); and the results of empirical and theoretical studies in the field of entrepreneurial education, as reflected in peer-reviewed literature.

Results. Based on the pedagogical interpretation of entrepreneurial thinking in high school students, we have identified five interrelated components that form its structure and correspond to the students' age and educational characteristics:

1. Motivational-Value Component. Content: Reflects the orientation of a high school student toward active, initiative-driven, and results-oriented activity, as well as the readiness to assume responsibility for one's own choices.

Indicators: Sustained interest in project-based activities; focus on achieving results; striving for personal success; acceptance of the values of initiative, responsibility, and independence;

2. Cognitive Component. Content*:* Characterizes the level of development of knowledge, concepts, and skills necessary for analyzing situations and identifying opportunities.

Indicators: Understanding of basic social processes; ability to analyze problem situations; capacity to identify alternative courses of action; ability to anticipate possible consequences of decisions;

3. Activity-Practical Component. Content: Reflects high school students' ability to actively apply knowledge in academic and project-based activities.

Indicators: Ability to set goals and plan activities; capacity to make decisions; readiness to take calculated risks; ability to organize teamwork; capability to achieve results.

4. Creative-Innovative Component. Content: Characterizes the ability to generate ideas and unconventional approaches to solving academic and social tasks.

Indicators: Demonstration of originality in thinking; ability to propose non-standard solutions; cognitive flexibility and variability; proactive idea generation; readiness to experiment.

5. Reflective-Evaluative Component. Content: Ensures that high school students reflect on and make sense of their own experiences.

Indicators: Ability for self-assessment and self-monitoring; capacity to analyze successes and failures; awareness of the causes of difficulties and setbacks; readiness to take responsibility for results.

Thus, entrepreneurial thinking in high school students represents a multi-level system comprising the motivational-value, cognitive, activity-practical, creative-innovative, and reflective-evaluative components, each of which has clearly identifiable pedagogical indicators that allow for the purposeful development and

assessment of its level within the educational process (Table 2).

Table 2

Structure, Indicators, and Diagnostic Methods of Entrepreneurial Thinking in High School Students

Components	Indicators	Diagnostic Methods and Techniques
Motivational-Value Component	- Interest in initiative-driven and project-based activities - Focus on achieving results - Strong aspiration for self-actualization - Acceptance of responsibility for one's choices - Positive attitude toward novelty	- Questionnaire on academic and social motivation (adapted school surveys) - Achievement Motivation Assessment (A. Mehrabian, adapted) - Pedagogical observation using an activity map - Expert evaluation (teachers, psychologists)
Cognitive	- Ability to analyze complex problem situations - Identification and evaluation of alternative solutions - Capacity to anticipate potential consequences - Level of critical and reflective thinking	- School-adapted critical thinking tests - Problem-based and situational tasks (case method) - Diagnostic written assignments - Evaluation of logical reasoning
Activity-Practical	- Goal-setting and planning - Independence in decision-making - Ability to work in a team - Achievement of intended outcomes	- Analysis of activity products (academic and social projects) - Pedagogical observation of project-based activities - Role-playing games with evaluation checklists - Pedagogical experiment
Creative-Innovative	- Originality of ideas - Cognitive flexibility - Initiative - Readiness to experiment	- Creative Thinking Test (E. Torrance, adapted) - Brainstorming method with expert evaluation - Analysis of creative assignments - Student achievement portfolio
Reflective-Evaluative	- Ability for self-assessment - Reflection on successes and failures - Awareness of underlying causes of difficulties - Adjustment and improvement of one's own activities	- Self-assessment and reflection tools for academic activities - Reflective questionnaires and surveys - Semi-structured interviews - Analysis of reflective reports and journals

Considering the identified components of entrepreneurial thinking in high school students and the analysis of domestic and international studies, it is possible to construct a scale of entrepreneurial thinking development levels. This scale allows for the conditional differentiation of each component's level of development from minimal to high and can be used as a reference for pedagogical analysis and the design of educational activities.

Table 3 illustrates the suggested framework for the developmental levels of entrepreneurial thinking in senior high school students, highlighting the correspondence of each component with its typical manifestations across various stages of development.

Table 3

Proposed Structure of Developmental Levels of Entrepreneurial Thinking in High School Students

Levels	Characteristics

		1. Motivational-Value Component
	Low	Academic and project-based activity is situational; motivation is primarily external (grades, supervision); initiative is weakly expressed; avoids responsibility and new types of activities.
	Mediu m	Shows a consistent interest in certain types of independent activities; combines external and internal motivation; assumes responsibility with teacher support; has a positive attitude toward novelty.
	High	Characterized by stable internal motivation; demonstrates initiative; consciously assumes responsibility for choices and outcomes; oriented toward self-actualization and goal achievement.
		2. Cognitive Component
	Low	Experiences difficulties in analyzing problem situations; relies on ready-made algorithms; has limited ability to identify alternatives and anticipate the consequences of decisions.
	Mediu m	Able to analyze situations using a model; identifies some possible solutions; forecasting of consequences is partial.
	High	Independently analyzes problem situations; identifies alternative solutions; anticipates possible consequences; demonstrates well-developed critical thinking.
		3. Activity-Practical Component
	Low	Unable to independently set goals and plan activities; requires constant teacher assistance; rarely completes tasks.
	Medium	Sets goals and plans activities with partial assistance; makes decisions in standard situations; able to complete tasks with support.
	High	Independently sets goals and plans activities; makes decisions under conditions of uncertainty; works effectively individually and in a team; brings activities to completion.
		4. Creative-Innovative Component
	Low	Prefers conventional solutions; avoids non-standard tasks; initiative and creativity are weakly expressed.
	Medium	Demonstrates creativity in familiar situations; proposes some original ideas; cognitive flexibility appears occasionally.
	High	Generates original ideas; demonstrates cognitive flexibility; actively proposes non-standard solutions; willing to experiment.
		5. Reflective-Evaluative Component
	Low	Not inclined to self-analysis; has difficulty assessing own actions and outcomes; perceives mistakes negatively.
	Mediu m	Capable of partial self-assessment; analyzes mistakes with teacher support; adjusts activities in standard situations.
	High	Consciously analyzes own activities; adequately evaluates outcomes; views mistakes as a resource for development; independently adjusts action strategies.

The presented scale of levels allows for qualitative and quantitative diagnostics; determination of the initial and final levels of entrepreneurial thinking development; and its use in the baseline, formative, and control stages of an experiment.

Discussion. The results of the empirical study indicate the effectiveness of the pedagogical interpretation of entrepreneurial thinking among high school students. This is supported by the conclusions of Yousaf et al., (2021), who argue that this approach can serve as a basis for the development of entrepreneurial competencies, particularly self-efficacy and proactiveness, mediated by the rapid growth of innovation-oriented thinking in the business domain. The results obtained in this study are consistent with the findings of Rajagopal et al., (2022), which confirm the effectiveness of the interpretive approach in developing entrepreneurial thinking, as it emphasizes the value-based and ethical foundations of professional self-determination. In this regard, it is methodologically justified to identify levels of entrepreneurial thinking that allow for differentiating the degree of development of each of its components from minimal to high,

and that serve as a tool for pedagogical analysis and the design of educational interventions.

These conclusions pave the way for ensuring high-quality learning by strengthening the beliefs of high school students in achieving high performance in the future. Al-Kwifi et al., (2023) emphasize that the development of entrepreneurial thinking is significantly supported by the implementation of co-working spaces and the facilitation of interpersonal communication.

Innovative processes occurring in all sectors of production in our country, along with the dynamics of the labor market, impose new requirements on the quality of education received by school graduates. In this context, the development of entrepreneurial thinking among high school students requires organizing the educational process based on practice-oriented forms of learning aimed at cultivating students' abilities to analyze socio-economic situations, design and implement educational projects, make informed decisions, and take responsibility for them. The effectiveness of this process is ensured through the inclusion of specialized programs and pedagogical technologies in the curriculum that stimulate cognitive activity, independence, and social initiative among students.

Conclusion. The pedagogical interpretation of entrepreneurial thinking in high school students allows it to be considered as an integrative characteristic of personality, encompassing motivational value, cognitive, activity-based, personal, and social components. Analysis of domestic and international studies has shown that entrepreneurial thinking is developed as a cognitive activity resource, enabling the ability to make reasoned decisions under conditions of uncertainty, and is realized through academic, project-based, and practice-oriented activities.

It has been found that school practice lacks systematic pedagogical mechanisms and diagnostic tools to ensure the purposeful development of entrepreneurial thinking, which confirms the need for the development of methodological support and educational programs. At the same time, the age characteristics of high school students and existing pedagogical approaches make it possible to conditionally distinguish levels of entrepreneurial thinking development, which can be used as a reference for the analysis and design of educational activities. Thus, the development of entrepreneurial thinking in high school students represents an objective pedagogical necessity, requiring the integration of motivational, cognitive, and personal components into the educational process, as well as the implementation of modern pedagogical approaches and specialized programs aimed at fostering social activity and the ability to make independent decisions.

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Barriers to High School Students' Acquisition of Linguo-Axiological Units and Challenges in the Formation of National Values

Abstract

Introduction. In modern society, one of the main tasks of the education system is to instill national and universal values in the younger generation. In this regard, linguistic axiology, a field that studies values in language, has emerged, and the issue of integrating it into educational content has become one of the pressing challenges. *Methodology and Methods.* The study involved an analysis of textbooks and curricula in the Kazakh language for grades 10–11 and a survey of Kazakh language and literature teachers (n=86). *Results.* The survey revealed five main groups of barriers: cognitive-conceptual, content-cultural, psychological-motivational, related to language environment and knowledge level, and methodological. *Scientific novelty.* The article presents a comprehensive psycholinguistic analysis of the barriers arising in the process of high school students' acquisition of linguo-axiological units (proverbs, phraseological units, and words with symbolic meaning) that contribute to the assimilation of national and cultural values, identifying their content-related and functional characteristics. *Practical significance.* The proposed ways to overcome these challenges include interdisciplinary integration, game-based and creative methods, the use of national-cultural material, and motivational support. The article highlights the methodological aspects of teaching the value content of Kazakh proverbs, phraseological units, and symbolic words, emphasizing their educational potential.

Keywords: linguoaxiology, value, axiological unit, national culture, linguistic consciousness, psycholinguistic barriers, methodology.

Introduction. In today's society, instilling national and universal human values in the younger generation is one of the main tasks of the education system. Especially after gaining independence, Kazakh linguistics began to develop within the anthropocentric paradigm, giving priority to revealing the nation's culture and worldview through language. A new field-linguistic axiology, which studies the values reflected in language-has emerged, and the issue of integrating it into educational content has become increasingly relevant. High school students represent the final stage of adolescence. During this period, they develop their life orientations and show a growing interest in spiritual and moral values. However, in the era of globalization, the openness of the information space and the strengthening influence of the internet and media pose challenges to the proper perception of national values by young people. In this regard, linguo-axiological units in the Kazakh language serve not only as linguistic material but also as an effective means of moral and ethical education.

Linguoaxiology is a branch of linguistics that studies the interrelation between language and values. The regularities of how "value" (axiological) categories are represented within the linguistic system constitute the central research focus of this field. Definitions of the concept of value provided in Kazakh linguistics are as follows:

There are cases when two types of signs coexist within certain words, a linguistic sign and a cultural sign. The core meanings of these two signs merge, forming a linguocultural sign that combines into a single conceptual unity and is preserved in the consciousness as one entity (Ualiev, 2009).

A value is a set of shared socio-psychological ideas and views accepted among the representatives of a particular nation (Nysanbaev, 2011). Axiological concepts form a system of concepts that reflect the national characteristics of thinking (Ahmetzhanova, 2016). Axiological values include notions and understandings of historical significance for the nation, as well as a set of norms and ethnosymbols formed in connection with lifestyle and interpersonal relations (Yernazarova, 2018).

Thus, scientific literature emphasizes that linguoaxiology, by examining the interconnection between language and culture, makes it possible to understand moral and aesthetic evaluations and values expressed through language. Therefore, the main objective of linguoaxiology is to analyze how concepts of value are structured and manifested through language within various socio-cultural contexts of society.

Linguoaxiology possesses an interdisciplinary nature at the intersection of philology and philosophy, as it studies the worldview, outlook, and system of values of humankind through linguistic means. For linguistic axiology, the key concept is the interrelation between language and the world of values within the framework of the "linguistic picture of the world", as well as its substantiation through linguistic data (Stepanova et al., 2024). In short, linguoaxiology examines language through the prism of a society's values and aims to identify, by means of linguistic facts, the concepts and evaluative criteria that a given speech community regards as most precious and meaningful.

In recent years, particular attention has been paid to the field of linguoaxiology in Kazakh linguistics – a natural phenomenon in the context of national spiritual renewal. This is because studying national values through language opens the way to a deeper understanding of the cultural and cognitive function of language.

The founder of Kazakh linguistics and educator Baitursynuly (1923) stated that "Language is the greatest sign of a human being", emphasizing that human values formed through the unity of language and cognition can be interpreted through language.

Academician Kaidar (2009) noted: "Language is the main means of social communication. It also performs the functions of preserving, transmitting, and processing information. The essence of reality receives its designation through language and is reflected in it. Language is not only a means of communication but also the source of human intellect, an inexhaustible treasury that is constantly developing and enriching" (Kaidar, 2009).

Indeed, any cultural concept that occupies a place in the value system of a particular ethnic group inevitably leaves its mark on the language. For example, in Kazakh culture, place names (toponyms) are not merely geographical designations; they reflect the people's history and what they hold sacred (such as Ulytau, Zhetysu, Bayanaul, Kokshetau, Aktau, etc.).

Vocabulary related to national traditions (nauryz, asar, kalyn mal, sünnet toi, etc.) expresses the axiological significance of those traditions. By analyzing how national cultural concepts (erlik – heroism, namys – honor, ar – dignity, ata-ana – parents, dostyk – friendship, etc.) are represented in linguistic

units, linguoaxiology enables a deeper understanding of a people's identity and worldview.

In Kazakh linguistics, there are many scholars who have examined the relationship between language and values from various perspectives. The earliest Kazakh linguists themselves attached great importance to the cognitive and educational functions of language. The great educator Baitursynuly (1926), while emphasizing the role of language in shaping human identity, demonstrated in his works that language reflects the culture and behavioral characteristics of a nation. According to the scholar, language is not merely a means of communication but also the guardian of a nation's entire essence, worldview, and values (Baitursynuly, 1923); "Science is the correct understanding of the world, that is, nature; without science, the understanding of the world cannot be correct" (Baitursynuly, 1926).

In Kazakh linguistics, the tradition of understanding national worldview through language was initiated by Baitursynuly (1923), and later continued by scholars such as K. Zhubanov (1933), Kaidar (2009), and Syzdyk (2009). Through the analysis of linguistic data, we can gain a deeper understanding of our people's way of life and value orientations.

Zhubanov (1933), in his linguistic research, paid particular attention to the connection between language and the national worldview. He emphasized that each nation develops its own outlook under the influence of the historical period and environment in which it lives, and that language serves as a reflection of these outlooks: "A person perceives every phenomenon through the worldview created by his historical era" (Zhubanov, 1933).

Zhubanov (1933) emphasized the importance of teaching the wisdom of the people through language in the field of education. In explaining grammatical concepts, he suggested using concrete examples drawn from real life, including names of tools and household items. The scholar opposed the uncritical adoption of ready-made methods from other nations and warned that using content closely aligned with the people's own worldview would be more effective in language teaching.

Amanzholov (1950) stated: "The language of every nation can depict the image of thought only in accordance with its own consciousness and worldview". He examined the history of language development in close connection with the evolution of the people and the ethnos, demonstrating that even local linguistic features are interrelated with the culture of the people who inhabit that region.

Syzdyk (2009) formulated the following conclusion: "At any stage, the main function of language is to serve as a means of communication between people, that is, to perform a *communicative function.* However, in addition to this, language fulfills several other functions of great importance in social life. One of these is the *cumulative function,* which ensures the transmission and continuity of the national consciousness, cultural and historical experience, and traditional heritage of the people who speak that language from generation to generation, from era to era, from one historical stage to another. Another is the *cognitive function,* which fulfills cognitive purposes. Each of these functions is of great significance for the modern Kazakh language" (Syzdyk, 2009).

At present, issues of linguoaxiology are also being actively studied by domestic scholars who examine the category of value from different perspectives.

In contemporary Kazakh society, within the framework of rukhani zhangyru ("Spiritual Revival"), the idea of Mangilik El ("Eternal Nation") has been advanced, defining nationwide values such as independence, unity, peace, secularity, and historical memory. Most of these notions already exist in our linguistic consciousness; however, in the new ideological context, incorporating them into school curricula can be considered an applied aspect of linguoaxiology. It is important to use the

axiological potential of language to convey national ideology to students.

This article analyzes, from a psycholinguistic perspective, the obstacles encountered in teaching high school students linguo-axiological units that serve to instill national and cultural values into their linguistic consciousness (for example, proverbs, idioms, and words with symbolic meaning).

The purpose of the study was to determine the nature of these obstacles, based on cognitive, cultural, psychological, linguistic-social, and methodological factors, and to propose scientific and methodological ways to overcome them.

The objectives of the article included examining the theoretical foundations of linguoaxiology, analyzing the peculiarities of how the concept of value is manifested in language, systematizing the problems that arise in the educational process while taking into account the psycholinguistic development characteristics of adolescents, and proposing effective solutions.

Materials and Methods. The research is based on the anthropocentric approach in linguistics, as well as on the theoretical foundations of linguoculturology and linguoaxiology. In addition, an integrated methodological framework was applied at the intersection of psycholinguistics, developmental psychology, and ethnopedagogy. The theoretical foundation of the study draws on the ideas of prominent founders of Kazakh linguistics, such as Baitursynuly (1923), Zhubanov (1999), Amanzholov (1950), Kaidar (2009), and Syzdyk (2009) concerning the interrelation between language and cognition and the understanding of national identity through language.

This work employed a mixed-methods design that combined qualitative content analysis of school textbooks with a cross-sectional survey of teachers. Each phase of the study, selection of materials, recruitment of participants, data collection, and data analysis, was planned and documented sequentially to ensure replicability.

State-approved Kazakh-language textbooks for grades 10 and 11 (current editions used during the 2023–2024 academic year) were used as primary materials. Each chapter was systematically reviewed to identify value-bearing linguistic units such as proverbs, idioms, and words with symbolic meaning. A coding sheet was developed to record the page number, lesson topic, type of axiological unit, and national-cultural theme. Two coders independently extracted and verified the units, resolving discrepancies through discussion.

Participants. A purposive sample of teachers who teach Kazakh Language and Literature to grades 10–11 was recruited from general secondary schools, gymnasiums, and lyceums across Kazakhstan. Inclusion criteria were: (1) teaching grades 10–11; (2) having at least one year of pedagogical experience; (3) working in a general education institution; and (4) voluntary participation. A total of 86 teachers participated in the study. Of these, 62% worked in urban schools and 38% in rural schools. Regarding teaching experience, 22% had 1–5 years, 38% had 5–10 years, and 40% had more than 10 years of experience.

Data Collection Tools. The questionnaire was designed to examine five groups of barriers: cognitive-conceptual, cultural-content, psychological-motivational, linguistic-environmental, and methodological. It consisted of 24 items divided into five sections: demographic information; conceptual understanding; cultural and language-environment issues; motivational factors; and pedagogical practices. Most items used a five-point Likert scale (1 = strongly disagree, 5 = strongly agree), while several were open-ended. The instrument was pilot-tested with five teachers, and minor revisions were made before full distribution.

The survey was administered online via Google Forms between February and April 2024. Participants received an

invitation email describing the study's aims and including an informed consent statement. Participation was anonymous and voluntary, and respondents could withdraw at any time without penalty.

Survey responses were downloaded into a secure spreadsheet and screened for completeness. Incomplete responses (less than 50% completion) were excluded from analysis (Appendix A). Textbook coding sheets were digitized and prepared for comparative analysis with survey findings.

Data Analysis Technique. Quantitative data were analyzed using descriptive statistics (frequencies and percentages). Cross-tabulations were conducted to examine differences based on teaching experience and school type. Open-ended responses were analyzed using qualitative content analysis. Textbook data were categorized according to the five identified barrier groups to identify patterns in value representation.

Ethical Consideration. Participation was voluntary, and informed consent was obtained from all respondents. No personally identifiable information was collected. As the study involved teachers and not minors, no additional institutional ethical approval was required.

Results. *Linguo-axiological units* are linguistic means that carry value-based meaning – that is, they reflect a people's evaluative attitudes, ethical norms, and worldview concepts. These include lexical units (individual words), phraseological expressions, proverbs and sayings (paremias), as well as concepts with symbolic meaning. For instance, among lexical items, there are words that directly denote values or implicitly refer to specific cultural notions.

In linguo-axiological analysis, the most attention is given to fixed expressions and proverbs, which embody the collective wisdom of the people. Proverbs and sayings are repositories of a nation's philosophy of life and accumulated experience – they constitute a treasury of values. Phraseologisms likewise preserve cultural connotations and evaluative nuances within their internal meaning.

Metaphorical images and symbolic words are also significant types of linguo-axiological units. For example, in Kazakh culture, the color "white" (aq) symbolizes purity and sincerity (aq zhol – "righteous path," aq niet – "good intention"), while "brown" (qonyr) conveys warmth, calmness, and moderation (qonyr un – "soft tone," qonyr minez – "gentle nature," qonyr kuz – "mild autumn").

The color "black" (qara) in the Kazakh worldview has a dual meaning – it can represent both positive and negative concepts. Negatively, it signifies grief, evil, or fear*: qara tunek* ("*utter darkness*") symbolizes despair and hardship, qara niet ("malicious intent") denotes ill will, and qara bult ("dark cloud") conveys impending danger. A grieving person is described metaphorically as having "covered themselves in black" (qara zhamuldy). However, in a positive sense, *qara* also denotes stability, sacredness, and enduring prosperity. For instance, *qara qazan ("black cauldron")* symbolizes family, livelihood, and abundance; qara shanyrak ("ancestral home") represents the spiritual center of the family and the continuity of generations. Likewise, *qara zher ("black earth")* reflects a person's eternal bond and loyalty to their homeland. The expression qara halyk ("common people") refers to the hardworking, ordinary folk – the foundation of the nation.

Such symbolic words reveal the worldview and system of values of the people. Thus, value-laden linguistic units manifest themselves at various levels of the language system:

Word → Phraseological unit → Text → Discourse

Linguoaxiology considers phenomena at all these levels as a unified system from the perspective of value-based meaning. Therefore, it is impossible to view linguoaxiology separately from the concepts of national cultural studies. The linguistic worldview of each nation is closely

intertwined with its history, way of life, and belief system. This can be clearly observed in Kazakh proverbs, phraseological units, and symbolic words (Table 1).

Table 1

The meaning/explanation of axiological units in the Kazakh

Axiological Units	Examples	Value Meaning / Explanation
Proverbs and Sayings	Ótiriktiń quıryǵy bír-aq útam	The value of truthfulness is exalted, and it is emphasized that lies are inevitably exposed; in other words, negative traits do not last for long.
	Áke kórgen oq jonar, sheshe kórgen ton písher	This proverb conveys the influence of parental example on a child's life, that is, it reflects the educational value of the family. The content of paremiological units (proverbs and sayings) is predominantly didactic and moral in nature.
	Sabyr túbi – sary altyn	It conveys the profound idea that the fruits of patience and perseverance are equal to gold; this highlights patience as one of the highest human values.
	Úlken bastar, kishi qostar	Suggests the norm of Kazakh etiquette, the value of respect for elders. Many proverbs and sayings use two-line comparison or contrast to juxtapose good and bad, offering a lesson to the listener.
	Jaqsynyń júrgen jeri – jaryq, jamannyń júrgen jeri – qárip	It conveys the underlying idea that a good person radiates light wherever they go and benefits others, whereas a bad person brings darkness and harm to those around them. This also employs evaluative contrast to emphasize and promote the value of goodness.
Phraseological Units	There are numerous idiomatic expressions in the Kazakh language, and a significant portion of them describe phenomena from an emotional and evaluative perspective. Beneath these phraseological units lie traces of the nation's history, customs, and worldview. For example, the idiom "at quirygyn kesisti" ("to cut the horse's tail") means to part completely and sever all relations. This expression originates from an ancient custom: when offended parties decided never to reconcile, they would cut the horse's tail so that they would never ride together again. Through this idiom, the idea of irreconcilable enmity and the warning against it are reflected. Another example, "it terisin basyna qaptady" ("covered someone's head with dog skin"), means to scold or humiliate someone severely. Implicit in this expression is a value-based orientation; it depicts the violation of a person's dignity and honor, the devaluation of human worth. The idiom "zhuregi tas tobesine shyqty" ("his heart rose to his throat") means "was terribly frightened." Here, the heart symbolizes the spiritual and moral center; its rising "to the top of the head" represents overwhelming fear or shock. Phraseological units are often rich in expressiveness, which makes them easy for students to remember. If a teacher explains the origin and cultural-semantic nuances of each idiom, learners can better sense the figurative power of the language, and through that, grasp the underlying values more easily. For instance, "kozdin qarashygyndai saqtay" ("to protect as the apple of one's eye") means to cherish and safeguard something dearly. Understanding the meaning of qarashyk ("pupil of the eye") helps a child comprehend that what is most precious should be guarded as carefully as one's eyesight, thus internalizing the idea of the sanctity of what is entrusted. In this way, numerous Kazakh idioms function as concise yet powerful tools for value transmission.	
Symbolic Words	Numeric Symbolism	The number seven is considered sacred in Kazakh culture (zheti ata – "seven ancestors," zheti qazyna - "seven treasures"), while the number forty symbolizes multitude and abundance (qyrqynan shygaru - "the fortieth-day ceremony," qyryqtyn biri –Qydyr - "one of the forty is Qydyr," Boiy bir qarys, saqaly qyryq qarys - "his height is one span, his beard forty spans," Zhaqsy ake jaman balaga

	qyruq jyl azyq - “a good father is a blessing to a bad son for forty years,” Qyrqyna shydaganda, qyryq birine de shydar - “if you endure forty, you can endure forty-one”). These numbers are not merely numerical indicators; in the national worldview, they carry sacred and symbolic meaning, which makes the expressions containing them particularly evocative and culturally significant.
Colour Symbolism	The color white symbolizes purity and goodness in Kazakh culture (aq bosaga – “white threshold,” aq neke – “pure marriage”). For example, in the expression “aq zhol tileu” (“to wish someone a white road”), the underlying value is the wish for goodness, success, and well-being for a person.
Animal Symbolism	Tulpar (horse) – symbolizes freedom and nobility (tulpar minip tu algan– “mounted on a tulpar and raised the flag”), Qyran (eagle) – represents bravery and loftiness (qyrandai qyragy – “as sharp-sighted as an eagle”).

Axiological units in the Kazakh language serve as a linguistic representation of the national worldview, a synthesized manifestation of the ethno-cultural code, and a primary vehicle for transmitting moral and ethical norms across generations. The nature of these units is multifaceted, encompassing cognitive, educational, linguo-cultural, worldview-oriented, and evaluative dimensions. Proverbs, phraseological units, and symbolic words function not only as linguistic mirrors of the Kazakh society's axiological system but also as vital psycholinguistic mechanisms in shaping the value orientations of students.

For example, proverbs such as “Ötiriktiñ quyryǵy bir-aq tutam” (“A lie has a short tail”), “Sabyr tübi – sary altyn” (“Patience brings reward”), and “Zhaqsynyñ jürgen zheri – zharyq” (“Where a good person walks, there is light”) are based on conceptual oppositions and possess a clear evaluative meaning. By contrasting moral dichotomies such as good/evil, truth/falsehood, and patience/anger, they form axiological models that are easily retained in consciousness. The conciseness, poetic form, and rhythmic structure of such paremiological units enable rapid cognitive encoding in adolescents, thereby enhancing the effectiveness of their educational influence.

Phraseological units also profoundly convey value-based meanings. Fixed expressions such as “at quyryǵyn kesisti” (“to sever relations”), “it terisin basyna qaptady” (“to subject someone to severe humiliation”), and “közdiñ qarashyǵyndai saqtau” (“to protect as the apple of one’s eye”) transmit not only denotative meaning but also cultural and social norms through their emotional and expressive coloring. In this case, semantics relies not on literal meanings but on a system of associations rooted in historical and cultural experience. The imagery inherent in phraseological units activates students’ abilities to imagine, compare, and form analogies, which constitutes a key mechanism for value comprehension at the linguocognitive level.

Symbolic words represent a semiotic system originating from the ancient layers of Kazakh culture. Sacred numbers such as "zheti" (seven) and "qyryq" (forty), or the symbolism associated with the color "aq" (white), reinforce concepts of integrity, purity, and prosperity within the national worldview. Animal imagery, such as the tulpar (horse), the eagle, or the dog, reflects the metaphorical transmission of the people's ethical categories.

From a linguo-axiological perspective, all these units define the evaluative function of language and the linguistic representation of national culture and ethical norms. Psycholinguistically, axiological units are anchored in a student's cognitive structure through emotional imagery, moral evaluation, and cultural stereotypes. Consequently, teaching such linguistic material is not merely a lexical or grammatical exercise; it is a complex socio-pedagogical process aimed at forming the value-based identity of the individual.

In the table (Table 1), we have analyzed several axiological units in the Kazakh language using specific examples. Proverbs and sayings reflect the wisdom and moral teachings of the people, while phraseological units reveal the figurative thinking and emotional evaluation characteristic of the national mindset (Konyratynbaev, 1991). Symbolic words, in turn, uncover the ethnocultural code of the Kazakh people. All of these represent value treasures that should be taught to upper secondary students in Kazakh language lessons, not merely as linguistic material, but as part of the nation's spiritual heritage. Instilling these treasures in young people undoubtedly contributes to the formation of their national consciousness and helps them gain a deeper understanding of their own identity.

Upper secondary students are typically adolescents aged approximately 15–17 years. In developmental psychology, this is referred to as the adolescent stage, characterized by rapid cognitive and emotional changes. From a cognitive perspective, the ability for abstract thinking in 15–17-year-olds can be considered fully developed (Urdabaeva & Rakhmatulina, 2018).

According to psychologists, adolescents reach a level of thinking at which they can perceive general principles rather than just specific situations. They are capable of considering all logical possibilities for solving a problem and can even imagine hypothetical scenarios that may not correspond to reality. For example, students at this age can respond to questions like "What would happen if…?" That is, they can mentally construct conditional or hypothetical situations and deduce their consequences. This is a hallmark of what is called formal-operational thinking.

From the perspective of emotional development, this period marks the growth of self-awareness and self-understanding (Vygotsky, 2006). Adolescents begin to observe themselves from an external perspective, evaluate their own behavior, and seek ideals or role models. If properly guided by parents and teachers, they are ready to internalize positive values. Conversely, without such guidance, value disorientation may occur they may struggle to distinguish right from wrong.

Therefore, the upper secondary years are particularly suitable for discussions and guidance on values. At this age, students are inclined to emulate positive ideals. For instance, they may show interest in the lives of notable figures, admire heroic or artistic representations of bravery, or look up to leaders in their social environment. Pedagogically, this provides an opportunity for effective value education, as students are prepared to understand abstract values through concrete examples.

Although adolescents' brains are somewhat ready to grasp complex, abstract concepts, special methods are needed for effective learning. Abstract concepts are categories that cannot be seen or touched but are understood through thought (e.g., honesty, honor, wisdom, etc.). Teaching such concepts is challenging because if they remain purely theoretical, they may fail to resonate with students and remain dry and disconnected words. Therefore, abstract concepts should be linked as much as possible to concrete images and real-life examples during lessons.

Another distinctive feature is that adolescents tend to approach abstract statements critically. Rather than memorizing a principle as it is, they often ask, "Why is it so?" and want to analyze it. This demonstrates the emergence of critical thinking, which teachers should guide in the right direction. In practice, this means presenting values not as rote propaganda, but as discoveries that students uncover through their own reflection.

In general, upper secondary students' ability to understand abstract concepts depends not only on their intellectual development but also on their level of interest. If a topic feels relevant and meaningful, they can grasp even complex concepts. Conversely, if the material seems

irrelevant or unclear, they may fail to engage with even simple ideas. Therefore, when teaching linguistic units containing valuable content, teachers should connect the material to students' lives and use motivational methods. According to cognitive psychology principles, the human brain processes information most deeply when it perceives it as necessary. To instill values, it is important to help adolescents understand how these values relate to their own lives and future. For example, when discussing the value of education, it can be linked to their future goals, career choices, and place in society.

When explaining abstract concepts from vocabulary, it is useful to follow the principle of moving from the known to the unknown: start with situations familiar to the student and gradually introduce unfamiliar concepts through them. Zhubanov (1999) emphasized the importance of staged presentation of material in lessons, recommending that difficult abstractions not be introduced all at once, but rather be built upon prior knowledge to make new concepts easier to grasp. Thus, practical analysis of values and visual or concrete illustration are effective for adolescent consciousness.

Another point to consider in accepting abstract concepts is the linguistic form. Sometimes, if terminology becomes too academic, the student may be deterred. Therefore, especially in Kazakh language lessons, when discussing values, it is important to use clear, student-friendly language. For instance, instead of using the term "tolerance", explaining it as "baisaldylyq, sabyrlylyq" (calmness, patience) in Kazakh can have a greater impact.

To reduce terminological barriers, it is effective to pair scientific terms with simple explanations. For example, when introducing the term "qundylyq" (value), it can be explained as "a valuable thing, asset, or quality". This helps anchor the abstract term to a concrete concept in memory.

High school students' understanding of linguo-axiological units largely depends on their national and cultural experiences. The national-cultural factor includes the linguistic and cultural environment in which the student is raised: family language, adherence to traditions, household culture, and the surrounding informational space, all of which influence the child's comprehension and internalization of values.

If a student grows up hearing the rich Kazakh folklore from a young age, listening to proverbs from grandparents, receiving blessings, and being raised in a traditional environment, their linguistic consciousness will have already internalized certain national values even before formal education. For such a child, learning linguo-axiological units at school is much easier, because they can sense the meaning of a familiar expression, or at least recognize something similar. Conversely, if a student's home language is different (Russian, English, or a mixed language) or if their parents do not emphasize traditions, Kazakh figurative expressions may be completely foreign to them. When explaining cultural expressions such as "kogentp", "qolqa salu", "qonaq kade", teachers must provide not only linguistic but also cultural context. It is unreasonable to expect a student with no background knowledge to immediately grasp such idioms.

One of the national-cultural factors is the student's own sense of national consciousness and perspective. Some urban children may unite over national things, while others may not want to accept them. For example, under the influence of mass culture, some young people may perceive old Kazakh words as "a sign of archaism." Here, the teacher should consider this: today's youth are the children of the information age, and their views are shaped by media and the internet. Therefore, conveying national values to them should be combined with modern communication methods. Only a student who feels the meaning of national culture will appreciate the linguoaxiological unit. That is, if they do not value respecting their own people and

loving their native language, they will not value the value in the linguistic unit either. This is an axiom. Therefore, from a psychological standpoint, awakening the student's sense of national identity is a prerequisite for acquiring values. For example, small discussions related to the topic can be organized in the Kazakh language class: "Which words in the Kazakh language seem especially evocative to you? Why?" Through such reflection, the adolescent begins to think about their own culture.

Furthermore, the national-cultural factor also encompasses the influence of the linguistic environment and the dominant culture. The curriculum of the Republic of Kazakhstan includes a concept of integrating values into the educational content, according to which all subjects, including language and literature lessons, should pay attention to both national and universal human values.

The national upbringing received from the family, the language of the surrounding environment, the student's interest in national culture, and the value-oriented work at school together influence how a student perceives linguo-axiological material. When these factors are favorable, linguo-axiological education is likely to be effective. Conversely, if these factors are lacking, additional efforts are required, such as filling cultural gaps, modeling the linguistic environment in the classroom, and instilling a sense of national pride in the student's heart. Therefore, from a psycholinguistic perspective, taking into account the learner's cultural knowledge is a crucial principle.

There are several key groups of obstacles in teaching linguo-axiological units (linguistic material with value-laden meaning). To identify these obstacles, a survey was conducted among teachers of Kazakh language and literature in senior classes (n=86). The survey asked the following question:

1. How do you understand the concept of "linguoaxiology"?

2. How do you interpret the notion of "national values"?

3. How would you assess the current level of students' comprehension regarding language units with national-cultural content?

4. Which linguoaxiological units do students find most difficult to understand?

5. What do you consider to be the main cause of these difficulties?

6. Do you observe psychological or cognitive barriers among students during lessons?

7. How do you evaluate the influence of the students' cultural and linguistic environment on their ability to perceive these units?

8. Which factor has the greatest impact on students' acquisition of linguoaxiological units?

9. Which teaching methods do you use most frequently?

10. What materials are needed to improve the teaching and acquisition of linguoaxiological units?

Respondents were allowed to select the types of obstacles. The results were as follows (Table 2):

Table 2

Survey results

Obstacles	Number of teachers (n)	Share (%)
Cognitive-Conceptual	56	65%
Content-Cultural	50	58%
Psychological-motivational obstacles	40	46%
Obstacles related to the linguistic environment and knowledge level	34	39%
Methodological obstacles	45	52%

The table shows the frequency of the five main obstacles identified by teachers based on the survey results. As the indicators show, the most frequently mentioned obstacle is cognitive-conceptual (65%), while the least frequently mentioned is related to the language environment and students' level of knowledge (39%). These data demonstrate the relevance of factors such as students' insufficient conceptual preparation and cultural experience, low motivation, and weak methodological support.

Cognitive-conceptual obstacles. This category refers to the gap between students' cognitive level and the conceptual complexity of a linguistic unit. Some value-related concepts may be too complex or unfamiliar. For example, understanding phrases like "qasqa zhol, eski zhol" ("narrow path, old path") requires historical knowledge (about the "Zheti Zhargy" laws), and without that knowledge, the student cannot understand them. Similarly, a student from an environment unfamiliar with terms like "obal" or "sauap" will find it difficult to grasp the religious-ethical content behind these words. In other words, if the concept of a particular lexeme or proverb has not formed in a student's mind, they cannot master it or may misunderstand it. To overcome such an obstacle, it is first necessary to establish the appropriate understanding in the student, a process that requires special time and effort. Cognitive obstacles also include the literal interpretation of metaphorical expressions: adolescents may take language at face value and fail to grasp its underlying meaning. For example, a student hearing "it basyna irkit togyly" for the first time might think it is about a dog (while it is actually a proverb about abundance). Thus, cognitive-conceptual difficulties arise from the lack of a connection between the student's prior knowledge and the new linguistic unit. To overcome them, a conceptual bridge should be created during explanations.

Content-cultural obstacles. These obstacles arise from the mismatch between the teaching material and the student's cultural experience. As mentioned above, if a student is unaware of the cultural context, they will find it difficult to understand the meaning of a particular phrase. For example, if a textbook contains a text about the ritual of "kolga su quy" (pouring water into the hand), not only a city student or a student of another nationality, but even some ethnic Kazakhs may not understand it (because they have never experienced it). Another example is certain proverbs like "Tustik omiring bolsa, keshtik mal zhi", which reflect old rural realities. Presenting these as-is to modern students can lead to misinterpretation due to cultural gaps. The reason for this is the value dissonance that arises from the overlap of contemporary and traditional cultures. Therefore, to address cultural obstacles, the teacher should engage the student's worldview in dialogue with traditional perspectives, explaining the reasons for differences and showing the place of each. Another point is that students may perceive some ethnocultural concepts as belonging only to a specific group (for example, thinking that giving a "bata" blessing is only for religious people or elders). In such cases, they consider the language distant from their own lives and do not focus deeply. All of these are examples of cultural misunderstandings arising from content. Until these are addressed, it is impossible to say that a student has truly mastered a lingvo-axiological unit.

Psychological-motivational obstacles. Students' internal psychological state also affects their mastery of value-laden material. Adolescents are sensitive to pedagogical appeals and didactic persuasion; they may react negatively. Therefore, when discussing values, it is necessary to overcome the resistance formed in peer environments, such as the perception that "it's not interesting." Another problem is generally low motivation for learning. In some adolescents, due to transitional developmental stages, interest in lessons temporarily decreases, and their attention is drawn elsewhere. In such cases, no matter

how valuable the content is, the student does not engage deeply. Thus, the teacher faces two tasks: first, to explain the value itself, and second, to stimulate interest in it. Psychologically, generating motivation is the most challenging task. Nevertheless, through proper methods (for example, competitions, awards, praise, engaging tasks, or linking content to real-life experiences), it is possible to overcome motivational obstacles.

Obstacles related to the language environment and level of knowledge. These obstacles arise from the student's language proficiency and the influence of the external environment. In such cases, presenting lingvo-axiological units requires emphasis or additional explanation. Moreover, another type of linguistic obstacle is the lack of terminological intuition. The student must first understand what the term means (this also relates to the cognitive obstacle mentioned above). Another complication arising from the language environment is thinking in a mixed language. If two languages coexist in a student's mind (Kazakh-Russian), they may fail to fully perceive the emotional nuance of figurative expressions. This is because when translating from one language to another, expressive meaning is often lost. For example, a student who does not know the phrase "it arqasy qiyanda" and tries to translate it directly into Russian as "tam, gde sobaka layet (where the dog barks)" will not grasp its meaning. At that moment, they attempt to replace it with a concept they already know in their own language, such as "ochen daleko" ("very far"). As a result, the unique quality of the fixed expression is lost, and it is perceived simply as a word meaning "very far". Thus, the student's linguistic consciousness retains an old translation rather than a new image. This is a specific obstacle of a bilingual or multilingual environment. In such cases, it is advisable to explicitly highlight each phraseological unit's national color and its unique, untranslatable characteristics. Obstacles related to the level of knowledge also include limited reading experience. Such students can be found even in high school, especially those inclined toward technical subjects or coming from environments where a culture of learning has not developed. The countermeasure is to strengthen interdisciplinary connections, linking lessons with literature and history, assigning small research tasks for homework, and providing additional materials beyond the textbook.

Methodological obstacles. These are difficulties arising from both teachers and the curriculum. First, there are a few ready-made methodological tools designed for systematically teaching lingvo-axiological knowledge in schools. Second, in some cases, the curriculum emphasizes only the structural aspects of language (grammar, orthography), while the cognitive and value-oriented aspects remain in the background. As a result, teachers may not devote enough attention to teaching language material related to values, or even if they do, there may not be enough time. Third, traditional teaching methods do not always allow students to develop independent analytical thinking. For example, memorizing value-laden units and recalling their definitions does not constitute true mastery. Research shows that in order for students to deeply understand the meaning of lingvo-axiological units, it is more effective to use methods such as analysis, connecting them to real-life experiences, and situational tasks. Moreover, adapting scientifically prepared content to the level of high school students is not easy; it requires the use of interdisciplinary links (literature, history, ethnography) and contemporary examples. Since it is challenging for each teacher to carry out such complex work individually, specialized methodological guidelines and courses are needed. Therefore, methodological shortcomings also represent a significant obstacle to teaching value-oriented concepts through language.

The obstacles classified above are not isolated phenomena but interconnected issues. In most cases, they manifest in a

complex, intertwined manner. Therefore, it is necessary to consider the difficulties in teaching lingvo-axiological units as a whole and to develop solutions from multiple perspectives.

To effectively teach high school students language units with value-laden content, the obstacles mentioned above must be systematically addressed. Below, we outline the main directions and methods recommended for this purpose.

First, an *anthropocentric approach* should be adopted in lessons. That is, language should be taught not merely as a set of grammatical structures but in connection with the spiritual world of the individual.

Second, *the unity of language and personality should be emphasized*. Students should be viewed not only as language learners but also as subjects with their own viewpoints and feelings.

Third, one of the key recommendations in lingvodidactics is *interdisciplinary integration*. In Kazakh language classes, when addressing value-related content, incorporating data from history, geography, and other natural sciences leaves a lasting impression.

Additionally, a *communicative approach* in lingvodidactics is effective. Language teaching should also foster a culture of communication. In this context, methods from critical thinking technology can be applied (e.g., essay writing, Bloom's Taxonomy questions, clustering, fishbone diagrams, debates, role-playing, INSERT technique, etc.). Particularly, *debates* are an engaging and stimulating method for high school students. Such lively lessons help students perceive words in the language as living and meaningful values.

The most effective way to teach lingvo-axiological units is to present them not in isolation but within a broader cultural context. For example, if the concept of "Zheti Qazyna" appears in the textbook, the teacher can first explain the legend or scholarly interpretation of these treasures. Then, analyzing each element of the concept (er zhigit-brave young man, sulu aiyel-beautiful woman, aqyl-bilim-wisdom, zhuiyrik at -swift horse, qyran burkit -eagle, Qumai Tazy, Berin myltyq) becomes an integrative cultural lesson. Students not only learn about Kazakh values, but also understand why each item was considered precious, and acquire new vocabulary.

This principle can be applied to all value-laden units: grounding them in historical events, using literary characters as examples, or relying on ethnographic data. Excursions and meetings with practitioners can also be utilized in this approach. Role-playing games are another means to establish a cultural environment. For instance, dramatizing traditional Kazakh wedding rituals clearly illustrates values such as respect for traditions, honoring elders, politeness, and artistry.

Also, dedicating 5–7 minutes of the lesson to audio-visual materials, followed by discussion, is highly effective. For example, if a student has never seen the tradition of "besikke salu," watching it in a video provides new information. Questions like "Why is a whip used? Why is the child placed in the cradle?" stimulate reflection and allow the teacher to explain through student responses.

Among cultural and cognitive materials, examples of folk oral literature occupy a central place. At the same time, national-cultural materials are not necessarily limited to Kazakh culture; sometimes it is useful to provide comparative cultural examples. For instance, a Kazakh proverb and an English proverb may convey the same idea: "Úyat ólimnen kúshti" corresponds in Russian to "Pozor khuzhe smerti" ("Shame is worse than death"), or "Adal dos – asyl qazyna" can be rendered in English as "A faithful friend is the medicine of life". When students see that the same value is emphasized across multiple languages, they can understand that it represents a universal human value. In particular, it is possible to compare a Kazakh value word with its English equivalent, such as "qonaqzhaılyq"

– “hospitality”, “ádilet” – “justice”, etc. Such integration, on the one hand, enhances linguistic cognition by showing correspondences between the two languages, and on the other hand, helps students grasp the universal significance of values.

Motivation, as noted above, is one of the decisive factors in learning. Therefore, to facilitate the assimilation of values, it is interest and engagement.

Table 3

Effective Methods for Teaching Linguo-Axiological Units to Senior Students

Method Name	Description and examples
Game-based methods	– “Maqal – söz atasy” (Proverbs – the father of words): Explain the meaning of a proverb using pictures or gestures, and the opposing team guesses it (mimic game). – “Who Knows More?”: A timed competition to write as many proverbs as possible on a given topic. – “Cube of Wisdom”: Say a proverb related to the word on a dice.
Development of Individual Creativity	– Complete the beginning of a proverb: e.g., “Batyr tusa – el yrysy, …” (If a hero is born, the wealth of the nation…). – Create a proverb using given words: e.g., “Jauyn, jer, enbek, dán” → (rain, land, labor, seed).
Use of modern technologies	– Organize online quizzes on Kahoot or Quizizz platforms. – Conduct social media contests of “funny proverbs” (false or humorous proverbs).
Individual Modeling and rewards	– Praise students who answer well in front of the class and post their photos on the “Active Students’ Corner”. – Award the title of “The best student” to outstanding students.
Self-knowledge and Reflection	– Answer questions such as «Name three values you appreciate most». – At the end of the lesson, complete sentences like «Today I learned…», «It was difficult for me…», «Next, I want to do…» – «Proverbs Tree»: Write learned proverbs and hang them on a tree to visually show progress.

Discussion. All these studies are based on the shared idea that language serves as a means of transmitting social and cultural values from one generation to the next. Therefore, the study of values from a linguistic perspective and their integration into the educational process have become a pressing demand of our time.

1) According to the research findings, 65% of the surveyed teachers indicated that the greatest difficulty in teaching linguoaxiological units is of a cognitive–conceptual nature. This category includes students’ insufficient understanding of abstract concepts, difficulties in identifying metaphorical and symbolic meanings, and a lack of historical and cultural background knowledge.

It was observed that most students tend to perceive the implicit meanings of proverbs literally and attempt to interpret phraseological units word-for-word. The quantitative data underscored the necessity of explaining the socio-cultural foundations of linguo-axiological units, such as "Sabyr tubi – sary altyn" ("Patience brings reward") and "It basyna irkit togilu" ("Abundance beyond measure"). This barrier suggests that while adolescents have reached the formal-operational stage of thinking, their systematic understanding and experience regarding national concepts remain underdeveloped.

2) Approximately 58% of respondents noted a lack of cultural experience as a barrier to students' comprehension of linguo-axiological vocabulary. Specifically, for students in urban schools, traditional Kazakh cultural codes and concepts such as "asar" (mutual aid), "zhora" (tradition/peer etiquette), and "kade" (ceremonial gift) proved to be unfamiliar. The survey results revealed a direct correlation between the home linguistic environment and the level of knowledge of traditions: students who actively use the Kazakh language within

their families internalize linguo-axiological units more rapidly, whereas those from mixed or Russian-speaking environments demonstrate significantly slower acquisition.

3) 46% of teachers identified low student motivation toward value-oriented content as a significant barrier. Adolescents tend to perceive such material as “theoretical” or “uninteresting,” and respondents noted that value-based content is sometimes viewed as having a “didactic” or “moralizing” character.

Several factors influencing the manifestation of this barrier were identified:

– emotional instability during adolescence;
– the influence of the social environment;
– the active formation of independent opinions;
– internal resistance to the acceptance of traditional values.

The survey results indicate that increasing motivation requires the use of game-based tasks, role-playing activities, and multimedia materials.

4) 39% of respondents noted that differences in students’ linguistic proficiency directly affect their perception of linguoaxiological units.

This barrier manifests in two main aspects:

1. Bilingualism, particularly among students raised in Russian-dominant environments, limits their ability to fully perceive the emotional and expressive meanings of Kazakh-language expressions, thereby reducing the axiological load of linguoaxiological units.

2. Differences in general educational background, as some students possess limited vocabulary, insufficient exposure to Kazakh literature, and minimal familiarity with folklore texts, which complicates their recognition of value markers within texts.

5) 52% of teachers identified insufficient methodological support as a primary obstacle. Specifically: (1) national value-based units are not presented systematically in textbooks; (2) methodological guidelines for teachers are inadequate; (3) limited classroom time restricts in-depth analysis of such material.

These findings demonstrate the need for an expanded instructional and methodological framework to ensure the systematic implementation of the linguoaxiological approach within the school curriculum.

Conclusion. The teaching of linguo-axiological units to senior students represents one of the important research areas within the anthropocentric direction of modern Kazakh linguistics. This process not only develops students’ linguistic and communicative competence but also contributes to shaping their national-cultural worldview and spiritual and moral orientation.

The research findings clearly demonstrate the presence of a range of psycholinguistic, cultural, and methodological barriers in the process of teaching linguoaxiological units to upper secondary school students. Based on the responses of Kazakh language and literature teachers who participated in the survey (n = 86), these barriers were classified into five main categories: cognitive conceptual (65%), content-related and cultural (58%), psychological motivational (46%), language environment and educational background–related (39%), and methodological barriers (52%). These indicators confirm the heterogeneity of students’ conceptual preparedness, cultural experience, and motivational levels within the instructional process.

First, cognitive conceptual barriers were found to be associated with students’ difficulties in understanding abstract concepts. Comprehending the implicit meanings of proverbs and phraseological units requires historical, religious, and cultural background knowledge; the absence of such knowledge significantly hinders the acquisition of linguoaxiological units. Second, socio-cultural content barriers are directly related to the students' national-

cultural experience. Symbols, ethnographic concepts, and cultural scripts inherent in traditional Kazakh culture do not always align with the worldview of modern youth, which is shaped by a globalized information environment. Consequently, these units require specialized pedagogical interpretation to bridge the gap between traditional values and contemporary reality. Third, psychological motivational barriers are characterized by adolescents' emotional instability and uneven cognitive engagement. When value-oriented content is perceived as "didactic" or "moralizing," students' intrinsic motivation toward such material tends to decline. Fourth, barriers related to the language environment and educational background are associated with students' existence in bilingual or mixed linguistic contexts. This situation limits their ability to fully perceive the emotional and expressive nuances of figurative expressions that are deeply embedded in national and cultural meanings. Fifth, methodological barriers are explained by the lack of systematic presentation of linguoaxiologically oriented instructional materials, the insufficient integration of value-based components within the curriculum, and the absence of specialized methodological guidelines available to teachers.

Overall, the research findings demonstrate that teaching linguoaxiological units is not limited to the development of linguistic competence alone; rather, it can serve as an effective mechanism for the gradual internalization of national values in students' consciousness. Therefore, work in this area should not be confined to linguistic analysis but should be combined with methodological solutions such as interdisciplinary integration, expansion of cultural context, the use of creative and game-based pedagogical technologies, and the incorporation of modern digital tools. As the study indicates, the conscious acquisition of linguoaxiological units contributes to strengthening students' national and cultural identity, enhancing their understanding of spiritual values, and fostering respect for the language. Consequently, the proposed approaches enable the effective integration of value-oriented linguistic units of the Kazakh language into the educational process and facilitate the alignment of national education with contemporary psycholinguistic requirements.

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Technologies for the Integration of Children with Special Educational Needs into the Developing Environment of Preschool Organizations

Abstract

Introduction. In the context of the transformation of the educational paradigm and the shift towards inclusive education, technological solutions are becoming a key factor in ensuring equal opportunities for all categories of learners. This article explores the problem of integrating children with special educational needs (SEN) into the developmental environment of preschool institutions through the use of modern technologies. *Methodology and Methods.* The study involved 27 preschool teachers. The survey included an assessment of material and technical resources, an analysis of the frequency of technology use, and a measurement of teachers' competency levels. *Results*. A critical gap was identified between the needs of inclusive education and the actual conditions for its implementation. Only a small proportion of institutions are fully equipped with the necessary technological resources, while the majority of existing technologies are considered outdated. The findings also reveal differences in how technologies are applied: they are widely used to support socialization and cognitive development, but are far less frequently employed for the correction of behavioral disorders. *Scientific novelty*. It has been experimentally proven that the effectiveness of technological integration of children with SEN is determined not only by the availability of technical means, but also by a complex of interrelated factors. A disproportion between teachers' high motivation to master technologies and their low actual competency in assistive technologies was identified and quantified. *Practical significance*. The research results can be used to develop modernization programs for preschool inclusive education. The identified barriers and teacher needs form the basis for creating a comprehensive system to support technological transformation. The proposed model for assessing technological readiness can be used to monitor the effectiveness of the implementation of digital solutions.

Keywords: children with special educational needs, technologies, developmental environment, preschool institutions.

Introduction. The modern system of preschool education faces a growing challenge associated with a steady increase in the number of children with special educational needs (Liu & Potmesil, 2025; Kamran & Bano, 2025). State support for inclusive education is enshrined in key documents such as the UN Convention on the Rights of Persons with Disabilities, the Salamanca Declaration, and the Law of the

Republic of Kazakhstan "On Education". The State Program for the Development of Education and Science for 2020-2025 defines expanding access to quality education for children with SEN as a priority. At the 2025 Global Disability Summit, UNICEF announced commitments for the next five years, which include supporting at least 50 countries in establishing multisectoral early intervention systems to provide individualized services to children with developmental delays and their families (Olusanya, 2025).

However, a significant gap exists between state initiatives and actual practice. According to research (Bilyalov, 2024; Turlubekova, 2021), preschool institutions in the Republic of Kazakhstan face a complex set of barriers when admitting children with developmental disabilities. The architectural environment of most kindergartens is not adapted for children with musculoskeletal disorders. The subject-based developmental environment does not account for the sensory and cognitive characteristics of children with various impairments. Teachers acknowledge the inadequacy of their training for working in inclusive groups.

Pop (2022) proves the importance of the preschool period for the formation of social competencies and cognitive development. Children with SEN who are included in a peer environment from an early age demonstrate better school adaptation, more developed communication skills, and greater independence. Concurrently, typically developing children develop tolerance, empathy, and a readiness for mutual assistance. At the same time, the mere formal presence of a child with disabilities in a group without systemic support creates risks for all participants in the educational process. Children with SEN may experience increased social isolation and develop secondary emotional disorders. Typically developing children, without pedagogical support in understanding their peers' differences, may form stigmatizing attitudes.

Winter& O'Raw (2010) offer individual solutions: methods for adapting the environment for specific conditions, teacher professional development programs, and models of psychological support for families. However, a holistic system of technologies that integrates all aspects of inclusion and considers the specifics of preschool-age remains underdeveloped. Key problems require technological solutions: how to transform the physical space of a kindergarten into an accessible and developmental environment for children with diverse needs; what pedagogical tools will ensure the meaningful inclusion of every child in the educational process; how to build productive collaboration among specialists of different profiles; how to involve families in the integration process; how to prepare the parent community to accept children with developmental differences. The study aims to assess the current state and prospects for the application of digital technologies in the inclusive practice of preschool education.

The issue of integrating children with special educational needs into the educational environment of preschool organizations is attracting increasing attention from researchers in various countries worldwide. Contemporary scientific research focuses on studying effective technologies and methods that promote the successful adaptation and learning of children with various developmental disorders in inclusive educational settings.

Assistive and information and communication technologies play a key role in the process of integrating children with SEN. A study by Al-Attiyah et al., (2022), conducted in Qatar with 183 early intervention program teachers, revealed a high level of assistive technology use in educating children with disabilities. Notably, the researchers found no statistically significant differences in the application of technologies based on teachers' work experience, their specialization, or the level of students' disabilities, indicating the universality of this approach (Al-Attiyah et al., 2022).

Similar findings were obtained in a study by Al-Dababneh and Al-Zboon (2022),

who examined the beliefs and professionalism of teachers regarding the use of assistive technologies in inclusive classrooms in Jordan. The study involved 157 teachers working with children with specific learning difficulties. The results showed a high level of teachers' self-assessment regarding the use of assistive technologies, with the perception of their own professionalism in using technologies scoring the highest, while the availability of assistive technologies received the lowest ratings. The study revealed a statistically significant correlation between teachers' beliefs and their professionalism, and also showed differences in technology availability between public and private schools in favor of the latter (Al-Dababneh & Al-Zboon, 2022).

A large-scale study in Ecuador by Segura et al., (2024) aimed to analyze the transformation of teaching methods supported by ICT for children with physical impairments. The study used a non-experimental design with a quantitative approach, involving 61 teachers. Correlation analysis revealed a significant positive relationship between ICT and inclusive teaching strategies ($r=0.976$, $p<0.01$), demonstrating that technological infrastructure and pedagogical competencies are determining factors for developing effective inclusive strategies. However, barriers such as a lack of adapted resources and specific teacher training were identified (Segura et al., 2024).

A promising direction is the use of various technological agents in teaching children with developmental disorders. Kirsal and Kahveci (2024) investigated the effectiveness of the simultaneous prompting method combined with small-group instruction using computer projection, SMART interactive whiteboards, tablet computers, and humanoid robots. The study involved 14 children with developmental disorders aged 10-15 years. Graphical analysis demonstrated the effectiveness of computerized simultaneous prompting using various technologies. The results showed that participants maintained the acquired skills and applied them to various tools, equipment, and people at the first, third, and fourth weeks after the intervention. The study also highlighted the high accuracy of participants' skill acquisition through observational learning (Kirsal & Kahveci, 2024).

Augmented reality technologies show significant potential for integrating children with SEN. Patiño et al., (2023) proposed an evaluation of the learning process for children with autism spectrum disorders through a mobile application with augmented reality. The authors emphasize that augmented reality technologies significantly improve the neurocognitive situation of children with ASD, allowing them to interact and communicate openly with both the real and digital worlds. The proposed augmented reality environment, which uses mobile devices for marker processing, enables children with ASD to interact and consolidate learning in a more dynamic way (Patiño et al., 2023).

An innovative approach to creating an adapted subject-developmental environment is the use of 3D printing for toy production. Jovanovic et al., (2023) presented a case study from Montenegro, emphasizing that toys have a significant impact on children's cognitive development, sensory perception, and creativity, as well as teaching children about themselves and their environment. 3D printing, as a rapidly developing technology, has found application in education and is particularly useful for manufacturing toys for children with disabilities, as the materials used are recyclable, eco-friendly, and can be created according to their specific needs (Jovanovic et al., 2023).

Researchers pay special attention to distance learning technologies for children with motor impairments. Ananchenkova and Volkova (2020) note that distance learning has a number of features that make it highly effective in working with children with disabilities, particularly those with cerebral palsy. The use of distance learning for children with motor pathologies allows for the consideration of each child's needs, interests, and capabilities, enabling lessons to be

conducted at a convenient and suitable time for them, while ensuring an individual pace of progress in mastering the educational material (Ananchenkova & Volkova, 2020).

A revolutionary direction in integration technologies is the application of artificial intelligence. Ghafghazi et al., (2021) presented an AI-ABA (AI-augmented learning and applied behavior analytics) platform to provide personalized treatment and learning plans for individuals with autism, intellectual disabilities, and developmental disorders. By defining systematic experiments alongside automated data collection and analysis, AI-ABA can promote self-regulating behavior using reinforcement-based augmented or virtual reality and other mobile platforms, helping clinicians focus on making accurate, data-driven decisions and enhancing the quality of individualized interventions (Ghafghazi et al., 2021).

The effectiveness of using mobile technologies in developing communication skills in children with autism spectrum disorders was demonstrated by Alzrayer, Banda, and Koul (2017). A study involving four children aged 8 to 10 years with ASD and other developmental disorders showed the effectiveness of systematic instruction in multi-step requesting skills using an iPad with the Proloquo2Go application. The results demonstrate that the intervention was effective in increasing multi-step requests. All participants, to varying degrees, successfully navigated the pages and combined symbols to request preferred items, demonstrating generalization of the newly acquired skills (Alzrayer et al., 2017). The conducted literature review indicates that modern technologies for integrating children with SEN are characterized by a significant diversity of approaches and methods. This study aims to comprehensively investigate technologies for supporting children with special educational needs (SEN) in preschool educational organizations of the Republic of Kazakhstan, using the city of Taraz as an example.

Materials and Methods. *Participants.* As part of an empirical study, a survey of 27 preschool teachers in the city of Taraz was conducted using the questionnaire method. The sample included teachers directly working with preschool-aged children, including children with special educational needs. A structured questionnaire, "The Use of Technologies in Working with Children with Special Educational Needs", was developed for data collection, allowing for a comprehensive assessment of the current state and prospects of using digital technologies in the inclusive practice of preschool education.

Data Collection Tools. The presented questionnaire for preschool teachers, "The Use of Technologies in Working with Children with Special Educational Needs", is a comprehensive research tool designed to study the current state and prospects of using digital technologies in inclusive preschool education. The questionnaire's structure covers eight interconnected blocks, providing a holistic picture of the technological readiness of teachers and organizations.

The questionnaire begins by examining the professional profile of the respondents, including teaching experience, education level, experience working with children with SEN, and any specialized training completed. Next, the material and technical resources of the preschool organizations are investigated by identifying available equipment from basic computers to specialized assistive devices and educational robots, with an assessment of their availability and technical condition. The third block focuses on the practical aspects of technology use: frequency of use, target areas of work, and specific programs used for developing cognitive abilities, speech, motor skills, socialization, and correction.

The main part of the questionnaire consists of an assessment of the effectiveness of technologies through ten key statements, measured on a five-point Likert scale. Respondents evaluate the impact of technologies on children's motivation, the individualization of the educational process, the development of various skills, social adaptation, and the creation of an inclusive

environment. Simultaneously, the self-assessment of teachers' professional competence in the field of digital technologies, knowledge of assistive technologies, and the ability to select and integrate technologies according to the individual needs of children are examined.

Particular attention is paid to identifying barriers that hinder the effective use of technologies, ranging from a lack of equipment and teaching materials to a deficit in knowledge and absence of technical support. The questionnaire investigates practices of interaction with parents and specialists regarding the use of technologies, including recommendations for home use and interdisciplinary collaboration. The tool concludes with a prospective planning section, where teachers indicate desired technologies - from interactive whiteboards to artificial intelligence systems - identify the necessary support for professional development, and express their readiness to share experiences with colleagues.

Results and Discussion. Methodologically, the questionnaire combines closed-ended multiple-choice questions and rating scales, ensuring the collection of quantitative data for statistical analysis (Tables 1,2).

Table 1

Survey Results

Block 1. General information about the respondent

Your teaching experience:

		Frequency	Percentages	Valid Percent	Cumulative Percent
Your teaching work experience:					
Valid	up to 3 years	3	11,1	11,1	11,1
	3-5 years	9	33,3	33,3	44,4
	6-10 years	8	29,6	29,6	74,1
	11-15 years	4	14,8	14,8	88,9
	more than 15 years	3	11,1	11,1	100,0
	Total	27	100,0	100,0	
Your education:					
Valid	Secondary vocational	7	25,9	25,9	25,9
	Higher (pedagogical)	12	44,4	44,4	70,4
	Higher (specialized)	6	22,2	22,2	92,6
	Other	2	7,4	7,4	100,0
	Total	27	100,0	100,0	

Do you have experience working with children with SEN?

Valid	Yes	17	63,0	63,0	63,0
	No	10	37,0	37,0	100,0
	Total	27	100,0	100,0	

Have you completed professional development courses on working with children with SEN?

Valid	Yes	10	37,0	37,0	37,0
	No	13	48,1	48,1	85,2
	I plan to	4	14,8	14,8	100,0
	Total	27	100,0	100,0	

Block 2. Availability and Accessibility of Technologies

Please assess the availability of technologies in your organization

		Frequency	Percentages	Valid Percent	Cumulative Percent
Valid	completely unavailable	3	11,1	11,1	11,1

	practically unavailable	6	22,2	22,2	33,3
	available only for specific groups	8	29,6	29,6	63,0
	available, but in limited quantity	7	25,9	25,9	88,9
	fully available and in sufficient quantity	3	11,1	11,1	100,0
	Total	27	100,0	100,0	

Please assess the technical condition of the equipment

Valid	not available	0	0,0	0,0	0,0
	unsatisfactory (frequently malfunctions)	9	33,3	33,3	33,3
	satisfactory (outdated but operational)	14	51,9	51,9	85,2
	good (functional, in working order)	4	14,8	14,8	100,0
	excellent (new, modern)	0	0,0	0,0	100,0
	Total	27	100,0	100,0	

What technologies are available in your preschool organization for working with children with SEN?

Valid	Computer/laptop

	Not available (0)	6	22,2	22,2	22,2
	Available (1)	21	77,8	77,8	100,0
	Total	27	100,0	100,0	
		Interactive whiteboard			
	Not available (0)	14	51,9	51,9	51,9
	Available (1)	13	48,1	48,1	100,0
	Total	27	100,0	100,0	
		Tablets			
	Not available (0)	15	55,6	55,6	55,6
	Available (1)	12	44,4	44,4	100,0
	Total	27	100,0	100,0	
		Projector			
	Not available (0)	5	18,5	18,5	18,5
	Available (1)	22	81,5	81,5	100,0
	Total	27	100,0	100,0	
		Specialized Software			
	Not available (0)	24	88,9	88,9	88,9
	Available (1)	3	11,1	11,1	100,0
	Total	27	100,0	100,0	
		Assistive devices			
	Not available (0)	20	74,1	74,1	74,1
	Available (1)	7	25,9	25,9	100,0
	Total	27	100,0	100,0	
		Audio/video equipment			
	Not available (0)	11	40,7	40,7	40,7
	Available (1)	16	59,3	59,3	100,0
	Total	27	100,0	100,0	
		Touch panels			
	Not available (0)	17	63,0	63,0	63,0
	Available (1)	10	37,0	37,0	100,0
	Total	27	100,0	100,0	
		Educational robots			
	Not available (0)	22	81,5	81,5	81,5
	Available (1)	5	18,5	18,5	100,0
	Total	27	100,0	100,0	
		Technologies are not available			
	No (0)	24	88,9	88,9	88,9
	Yes (1)	3	11,1	11,1	100,0
	Total	27	100,0	100,0	

Block 3. Use of Technologies in Working with Children with SEN

Frequency_of_use		Frequency	Percentages	Valid Percent	Cumulative Percent
Valid	daily	3	11,1	11,1	11,1
	2-3 times a week	4	14,8	14,8	25,9
	once a week	7	25,9	25,9	51,9
	1-2 times a month	5	18,5	18,5	70,4
	rarely	2	7,4	7,4	77,8

I do not use	6	22,2	22,2	100,0
Total	27	100,0	100,0	

For what purposes do you use technologies when working with children with SEN? (you may select multiple options)

			Cognitive development		
Valid	Not used(0)	6	22,2	22,2	22,2
	Used (1)	21	77,8	77,8	100,0
	Total	27	100,0	100,0	
			Speech development		
	Not used(0)	10	37,0	37,0	37,0
	Used (1)	17	63,0	63,0	100,0
	Total	27	100,0	100,0	
			Fine motor skills		
	Not used(0)	10	37,0	37,0	37,0
	Used (1)	17	63,0	63,0	100,0
	Total	27	100,0	100,0	
			Socialization		
	Not used(0)	5	18,5	18,5	18,5
	Used (1)	22	81,5	81,5	100,0
	Total	27	100,0	100,0	
			Behavior correction		
	Not used(0)	19	70,4	70,4	70,4
	Used (1)	8	29,6	29,6	100,0
	Total	27	100,0	100,0	
			Emotional development		
	Not used(0)	14	51,9	51,9	51,9
	Used (1)	13	48,1	48,1	100,0
	Total	27	100,0	100,0	
			Daily living skills		
	Not used(0)	14	51,9	51,9	51,9
	Used (1)	13	48,1	48,1	100,0
	Total	27	100,0	100,0	
			Assessment		
	Not used(0)	16	59,3	59,3	59,3
	Used (1)	11	40,7	40,7	100,0
	Total	27	100,0	100,0	

Block 4. Evaluation of Technology Effectiveness

The use of technologies increases motivation for learning in children with SEN

		Frequency	Percentages	Valid Percent	Cumulative Percent
Valid	1	3	11,1	11,1	11,1
	2	3	11,1	11,1	22,2
	3	2	7,4	7,4	29,6
	4	14	51,9	51,9	81,5
	5	5	18,5	18,5	100,0
	Total	27	100,0	100,0	

Technologies help to individualize the educational process

Valid	1	2	7,4	7,4	7,4
	2	3	11,1	11,1	18,5
	3	4	14,8	14,8	33,3
	4	10	37,0	37,0	70,4
	5	8	29,6	29,6	100,0
	Total	27	100,0	100,0	

The application of technologies promotes the development of cognitive abilities in children with SEN

Valid	1	3	11,1	11,1	11,1
	2	2	7,4	7,4	18,5

	3	3	11,1	11,1	29,6
	4	11	40,7	40,7	70,4
	5	8	29,6	29,6	100,0
	Total	27	100,0	100,0	

Technologies are effective for developing communication skills

Valid	1	4	14,8	14,8	14,8
	2	2	7,4	7,4	22,2
	3	4	14,8	14,8	37,0
	4	9	33,3	33,3	70,4
	5	8	29,6	29,6	100,0
	Total	27	100,0	100,0	

The use of technologies improves the social adaptation of children with SEN

Valid	1	2	7,4	7,4	7,4
	2	1	3,7	3,7	11,1
	3	9	33,3	33,3	44,4
	4	6	22,2	22,2	66,7
	5	9	33,3	33,3	100,0
	Total	27	100,0	100,0	

Technologies enable more effective monitoring of a child's developmental progress

Valid	1	2	7,4	7,4	7,4
	2	5	18,5	18,5	25,9
	3	5	18,5	18,5	44,4
	4	6	22,2	22,2	66,7
	5	9	33,3	33,3	100,0
	Total	27	100,0	100,0	

The use of technologies saves teacher time

Valid	1	2	7,4	7,4	7,4
	2	3	11,1	11,1	18,5
	3	4	14,8	14,8	33,3
	4	9	33,3	33,3	66,7
	5	9	33,3	33,3	100,0
	Total	27	100,0	100,0	

Technologies facilitate the involvement of parents in the educational process

Valid	1	1	3,7	3,7	3,7
	2	1	3,7	3,7	7,4
	3	8	29,6	29,6	37,0
	4	9	33,3	33,3	70,4
	5	8	29,6	29,6	100,0
	Total	27	100,0	100,0	

My level of proficiency with computers and digital technologies

Valid	1	3	11,1	11,1	11,1
	2	2	7,4	7,4	18,5
	3	7	25,9	25,9	44,4
	4	12	44,4	44,4	88,9
	5	3	11,1	11,1	100,0
	Total	27	100,0	100,0	

My knowledge of assistive technologies for children with SEN

Valid	1	2	7,4	7,4	7,4
	2	4	14,8	14,8	22,2
	3	15	55,6	55,6	77,8

	4	5	18,5	18,5	96,3
	5	1	3,7	3,7	100,0
	Total	27	100,0	100,0	

My ability to select technologies according to the individual needs of a child with SEN

Valid	1	1	3,7	3,7	3,7
	2	3	11,1	11,1	14,8
	3	12	44,4	44,4	59,3
	4	9	33,3	33,3	92,6
	5	2	7,4	7,4	100,0
	Total	27	100,0	100,0	

My ability to integrate technologies into the educational process

Valid	1	1	3,7	3,7	3,7
	2	1	3,7	3,7	7,4
	3	12	44,4	44,4	51,9
	4	10	37,0	37,0	88,9
	5	3	11,1	11,1	100,0
	Total	27	100,0	100,0	

My knowledge of specialized software for children with different diagnoses

Valid	1	3	11,1	11,1	11,1
	2	11	40,7	40,7	51,9
	3	9	33,3	33,3	85,2
	4	1	3,7	3,7	88,9
	5	3	11,1	11,1	100,0
	Total	27	100,0	100,0	

My readiness to learn new technologies for working with children with SEN

Valid	1	1	3,7	3,7	3,7
	3	5	18,5	18,5	22,2
	4	7	25,9	25,9	48,1
	5	14	51,9	51,9	100,0
	Total	27	100,0	100,0	

Barrier (outdated equipment)

Valid	0	5	18,5	18,5	18,5
	1	22	81,5	81,5	100,0
	Total	27	100,0	100,0	

Barrier (No teaching materials)

Valid	0	9	33,3	33,3	33,3
	1	18	66,7	66,7	100,0
	Total	27	100,0	100,0	

Barrier (lack of knowledge)

Valid	0	12	44,4	44,4	44,4
	1	15	55,6	55,6	100,0
	Total	27	100,0	100,0	

Barrier (No technical support)

Valid	0	23	85,2	85,2	85,2

	1	4	14,8	14,8	100,0
	Total	27	100,0	100,0	
Barrier (lack of time)					
Valid	0	16	59,3	59,3	59,3
	1	11	40,7	40,7	100,0
	Total	27	100,0	100,0	
Barrier (high cost of software)					
Valid	0	20	74,1	74,1	74,1
	1	7	25,9	25,9	100,0
	Total	27	100,0	100,0	
Barrier (administration resistance)					
Valid	0	18	66,7	66,7	66,7
	1	9	33,3	33,3	100,0
	Total	27	100,0	100,0	
	Total	27	100,0	100,0	

Block 5. Prospects and Needs

What support do you need for more effective use of technologies? (you may select multiple options)

Support: Professional Development Courses

		Frequency	Percentages	Valid Percent	Cumulative Percent
Valid	0	6	22,2	22,2	22,2
	1	21	77,8	77,8	100,0
	Total	27	100,0	100,0	
Support: Master Classes					
Valid	0	11	40,7	40,7	40,7
	1	16	59,3	59,3	100,0
	Total	27	100,0	100,0	
Support: Teaching Guides					
Valid	0	8	29,6	29,6	29,6
	1	19	70,4	70,4	100,0
	Total	27	100,0	100,0	
Support: Experience Sharing					
Valid	0	6	22,2	22,2	22,2
	1	21	77,8	77,8	100,0
	Total	27	100,0	100,0	
Support: Specialized Technical Support					
Valid	0	12	44,4	44,4	44,4
	1	15	55,6	55,6	100,0
	Total	27	100,0	100,0	
Support: Financial Support					
Valid	0	10	37,0	37,0	37,0
	1	17	63,0	63,0	100,0
	Total	27	100,0	100,0	
Willingness to share experience					
Valid	1	13	48,1	48,1	48,1
	2	6	22,2	22,2	70,4
	3	5	18,5	18,5	88,9
	4	3	11,1	11,1	100,0
	Total	27	100,0	100,0	

Table 2

Overall Summary (Descriptive Statistics)

	N	Range	Minimum	Maximum	Sum	Mean	Standard Deviation	Variance	Skewness		Kurtosis	
	Statistics					Standard Error	Statistics		Statistics	Standard Error	Statistics	Standard Error
Work experience	27	4	1	5	76	2,81	,227	1,178	1,387	,387	,448	-,540	,872
Education	27	3	1	4	57	2,11	,172	,892	,795	,473	,448	-,321	,872
Experience working with SEN	27	1	1	2	37	1,37	,095	,492	,242	,569	,448	-1,817	,872
Courses on SEN	27	2	1	3	48	1,78	,134	,698	,487	,335	,448	-,804	,872
Technology training	27	2	1	3	47	1,74	,114	,594	,353	,122	,448	-,347	,872
Tech. computer	27	1	0	1	21	,78	,082	,424	,179	-1,416	,448	,000	,872
Tech. interactive whiteboard	27	1	0	1	13	,48	,098	,509	,259	,079	,448	-2,160	,872
Tech. tablets	27	1	0	1	12	,44	,097	,506	,256	,237	,448	-2,106	,872
Tech. projector	27	1	0	1	22	,81	,076	,396	,157	-1,718	,448	1,021	,872
Tech. specialized software	27	1	0	1	3	,11	,062	,320	,103	2,623	,448	5,265	,872
Tech. assistive devices	27	1	0	1	7	,26	,086	,447	,199	1,164	,448	-,702	,872
Tech. audio video	27	1	0	1	16	,59	,096	,501	,251	-,399	,448	-1,994	,872
Tech. touch panels	27	1	0	1	10	,37	,095	,492	,242	,569	,448	-1,817	,872
Tech. robots	27	1	0	1	5	,19	,076	,396	,157	1,718	,448	1,021	,872
Tech. not available	27	1	0	1	3	,11	,062	,320	,103	2,623	,448	5,265	,872
Availability of technologies	27	4	1	5	82	3,04	,229	1,192	1,422	-,076	,448	-,763	,872
Technical condition	27	2	2	4	76	2,81	,131	,681	,464	,247	,448	-,711	,872
Frequency of use	27	5	1	6	98	3,63	,321	1,668	2,781	,105	,448	-1,065	,872
Purpose (cognitive development)	27	1	0	1	21	,78	,082	,424	,179	-1,416	,448	,000	,872
Purpose (speech development)	27	1	0	1	17	,63	,095	,492	,242	-,569	,448	-1,817	,872
Purpose (fine motor skills)	27	1	0	1	17	,63	,095	,492	,242	-,569	,448	-1,817	,872
Purpose (socialization)	27	1	0	1	22	,81	,076	,396	,157	-1,718	,448	1,021	,872
Purpose (behavior correction)	27	1	0	1	8	,30	,090	,465	,217	,946	,448	-1,201	,872
Purpose (emotional development)	27	1	0	1	13	,48	,098	,509	,259	,079	,448	-2,160	,872
Purpose (daily living skills)	27	1	0	1	13	,48	,098	,509	,259	,079	,448	-2,160	,872
Purpose (assessment)	27	1	0	1	11	,41	,096	,501	,251	,399	,448	-1,994	,872
Prog. (educational games)	27	1	0	1	22	,81	,076	,396	,157	-1,718	,448	1,021	,872
Prog. (speech therapy apps)	27	1	0	1	9	,33	,092	,480	,231	,749	,448	-1,560	,872
Prog. (AR applications)	27	1	0	1	9	,33	,092	,480	,231	,749	,448	-1,560	,872
Prog. (AAC programs)	27	1	0	1	8	,30	,090	,465	,217	,946	,448	-1,201	,872
Prog. (interactive books)	27	1	0	1	13	,48	,098	,509	,259	,079	,448	-2,160	,872
Prog. (video lessons)	27	1	0	1	22	,81	,076	,396	,157	-1,718	,448	1,021	,872
Prog. (music applications)	27	1	0	1	11	,41	,096	,501	,251	,399	,448	-1,994	,872
Prog. (art therapy)	27	1	0	1	13	,48	,098	,509	,259	,079	,448	-2,160	,872
Prog. (corrective programs)	27	1	0	1	13	,48	,098	,509	,259	,079	,448	-2,160	,872
Prog. (not used)	27	1	0	1	3	,11	,062	,320	,103	2,623	,448	5,265	,872

Effect (motivation)	27	4	1	5	96	3,56	,241	1,251	1,564	-,964	,448	-,052	,872
Effect (individualization)	27	4	1	5	100	3,70	,238	1,235	1,524	-,840	,448	-,130	,872
Effect (cognitive development)	27	4	1	5	100	3,70	,249	1,295	1,678	-1,004	,448	,072	,872
Effect (communication skills)	27	4	1	5	96	3,56	,269	1,396	1,949	-,765	,448	-,600	,872
Effect (social adaptation)	27	4	1	5	100	3,70	,232	1,203	1,447	-,664	,448	-,072	,872
Effect (progress tracking)	27	4	1	5	96	3,56	,258	1,340	1,795	-,439	,448	-1,056	,872
Effect (time saving)	27	4	1	5	101	3,74	,242	1,259	1,584	-,844	,448	-,207	,872
Effect (parental involvement)	27	4	1	5	103	3,81	,200	1,039	1,080	-,712	,448	,483	,872
Comp. (computer proficiency)	27	4	1	5	91	3,37	,221	1,149	1,319	-,808	,448	,100	,872
Comp. (knowledge of assistive technologies)	27	4	1	5	80	2,96	,173	,898	,806	-,268	,448	,805	,872
Comp. (technology selection)	27	4	1	5	89	3,30	,176	,912	,832	-,325	,448	,501	,872
Comp. (integration into the process)	27	4	1	5	94	3,48	,172	,893	,798	-,465	,448	1,193	,872
Comp. (knowledge of specialized software)	27	4	1	5	71	2,63	,214	1,115	1,242	,818	,448	,429	,872
Comp. (willingness to learn)	27	4	1	5	114	4,22	,195	1,013	1,026	-1,443	,448	2,337	,872
Barrier (lack of equipment)	27	1	0	1	20	,74	,086	,447	,199	-1,164	,448	-,702	,872
Barrier (outdated equipment)	27	1	0	1	22	,81	,076	,396	,157	-1,718	,448	1,021	,872
Barrier (no teaching materials)	27	1	0	1	18	,67	,092	,480	,231	-,749	,448	-1,560	,872
Barrier (lack of knowledge)	27	1	0	1	15	,56	,097	,506	,256	-,237	,448	-2,106	,872
Barrier (no technical support)	27	1	0	1	4	,15	,070	,362	,131	2,099	,448	2,594	,872
Barrier (lack of time)	27	1	0	1	11	,41	,096	,501	,251	,399	,448	-1,994	,872
Barrier (high cost of software)	27	1	0	1	7	,26	,086	,447	,199	1,164	,448	-,702	,872
Barrier (administration resistance)	27	1	0	1	9	,33	,092	,480	,231	,749	,448	-1,560	,872
Support (professional development courses)	27	1	0	1	21	,78	,082	,424	,179	-1,416	,448	,000	,872
Support (master classes)	27	1	0	1	16	,59	,096	,501	,251	-,399	,448	-1,994	,872
Support (teaching guides)	27	1	0	1	19	,70	,090	,465	,217	-,946	,448	-1,201	,872
Support (experience sharing)	27	1	0	1	21	,78	,082	,424	,179	-1,416	,448	,000	,872
Support (specialized technical support)	27	1	0	1	15	,56	,097	,506	,256	-,237	,448	-2,106	,872
Support (financial support)	27	1	0	1	17	,63	,095	,492	,242	-,569	,448	-1,817	,872
Willingness to share experience	27	3	1	4	52	1,93	,206	1,072	1,148	,765	,448	-,743	,872
N valid (by list)	27												

The results reveal a complex picture of the current state of technological integration for children with special educational needs within the preschool education system. The study, which involved 27 preschool teachers, identified a significant contradiction between the specialists' high level of education and their insufficient training for working with modern technologies in an inclusive environment. While two-thirds of the respondents have a higher education, and 63% work directly with children with SEN, only 37% have completed specialized professional development courses in this area.

The results indicate a critical state of the material and technical resources in preschool organizations. Full availability of technologies in sufficient quantity was reported in only 11.1% of cases, while a third of the organizations are characterized by an almost complete lack of necessary equipment. The technical condition of the existing technological means is assessed as outdated or unsatisfactory in 85.2% of cases, creating significant obstacles for effective work with children with special educational needs.

The analysis of the frequency of technology use reveals insufficient integration of digital tools into daily pedagogical practice. Daily use of technologies was recorded for only 11.1% of teachers, while 22.2% do not use them at all. The mean frequency of use is 3.63 with a high standard deviation of 1.668, indicating significant heterogeneity in technology application practices among different organizations and teachers.

The results identify a differentiated approach to the use of technologies in various areas of development for children with SEN. Technologies are used most actively for socialization (81.5%), cognitive development (77.8%), and individual work (63%). Conversely, only 29.6% of teachers use technologies for behavior correction, indicating an insufficient understanding of the potential of digital tools in corrective pedagogy.

Despite the existing limitations, teachers demonstrate a high assessment of the effectiveness of technologies. The mean effectiveness scores are 3.56 for increasing motivation, 3.70 for individualizing the educational process, and 3.70 for developing cognitive abilities. The potential of technologies for engaging parents in the educational process is rated particularly highly (mean score 3.81), underscoring the importance of technologies as a tool for creating a unified educational space.

Statistical analysis of teacher competence reveals significant gaps in professional training. Knowledge of assistive technologies is below average (2.96), while knowledge of specialized software for children with different diagnoses is only 2.63. At the same time, the readiness-to-learn indicator reaches 4.22, demonstrating negative skewness (-1.443), which indicates high motivation for professional development among the majority of teachers.

The study identifies key barriers hindering effective technology integration. Outdated equipment is noted by 81.5% of respondents, lack of equipment by 74.1%, absence of teaching materials by 66.7%, and lack of knowledge by 55.6%. Notably, administrative barriers and resistance from management are reported by only a third of respondents (33.3%), suggesting that administrative readiness for innovation is hindered when the necessary resources are available.

The analysis of support needs demonstrates a clear understanding by teachers of the necessary interventions. Professional development courses are needed by 77.8% of respondents, with the same percentage emphasizing the importance of sharing experiences with colleagues. Teaching manuals are required by 70.4% of teachers, specialist consultations by 63%, and financial support by 63%. The high consistency in assessing needs points to the systemic nature of the problems and the necessity for a comprehensive approach to their resolution.

Analysis of variance for the indicators reveals significant variability across most parameters, indicating uneven development of technological inclusion within the preschool education system. Coefficients of variation for key indicators exceed 30%, pointing to substantial differences between organizations in the level of technological readiness and the practice of using digital tools.

The study's results demonstrate that the process of technological integration for children with special educational needs is at an early stage of development, characterized by high potential alongside significant systemic constraints. The identified gap between teacher motivation and available

resources requires immediate comprehensive measures, including modernization of the material and technical base, development of specialized teaching materials, and systematic professional development for teachers. Without targeted state policy and substantial investment in the technological infrastructure of preschool education, achieving the goals of inclusion will remain declarative.

Conclusion. An analysis of the empirical data from the conducted study on technology integration for children with special educational needs into the developmental environment of preschool organizations reveals a contradiction between the declared goals of inclusive education and the real conditions for their implementation. The high motivation of the teaching community to master new technologies and the recognition of their effectiveness for various aspects of development in children with SEN clash with systemic constraints of an infrastructural, methodological, and competency nature. This contradiction creates a situation of a "technology gap", where the potential of modern digital solutions remains unrealized due to the absence of necessary conditions for their implementation. The identified unevenness in the development of technological inclusion among different preschool organizations creates risks of deepening educational inequality. Children with special educational needs attending institutions with better technological resources gain significant advantages in development and socialization compared to children in organizations where such opportunities are absent.

The concentration of efforts on socialization and cognitive development, coupled with insufficient attention to corrective work, indicates an incomplete understanding by teachers of the spectrum of possibilities offered by modern technological solutions. There is a need to develop comprehensive methodological recommendations demonstrating the effectiveness of technologies for the entire continuum of educational and correctional-developmental tasks. Overcoming the competency deficit among teachers is of paramount importance for successful technology integration. The identified gap between general pedagogical qualifications and specialized technological competencies necessitates the creation of a multi-level system of professional development, encompassing both basic training in digital technologies and advanced study of specialized tools for working with various categories of children with SEN.

The study's results substantiate the necessity of transitioning from fragmented initiatives to a systemic state policy for the technological modernization of preschool inclusive education. Such a policy should include: targeted funding for updating material and technical resources; creating a national repository of adapted educational technologies; establishing a network of resource centers for methodological support; developing professional standards in the application of technologies in inclusive education; and creating a system for monitoring the effectiveness of technology integration.

Prospects for further research are associated with studying the differential effectiveness of various technological solutions for specific categories of children with SEN, developing criteria for assessing the readiness of preschool organizations for technological transformation, and creating predictive models for the development of an inclusive educational environment in the context of digitalization. Only a comprehensive, scientifically grounded approach to technology integration will realize the principle of equal educational opportunities and ensure the full development of every child, regardless of their individual characteristics.

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The Impact of Various Theoretical Approaches on the Development of Students' Soft Skills

Abstract

Introduction. The study examines the theoretical foundations underlying the development of soft skills in contemporary education, focusing on three major learning theories: constructivism, humanistic pedagogy, and socio-cognitive theory. The research addresses the problem of identifying how these theoretical perspectives shape instructional approaches aimed at fostering students' personal, social, and self-regulatory competencies. *Methodology and Methods.* A theoretical and analytical review of key concepts, principles, and trends within the selected learning theories was conducted. Their core assumptions were comparatively analyzed to determine their pedagogical implications for soft skills development. *Results.* The analysis revealed that constructivism emphasizes the active construction of knowledge through learners' prior experience and social interaction, thereby supporting collaboration and critical thinking. Humanistic pedagogy prioritizes student-centered learning, individual interests, and personal growth, contributing to the development of self-awareness and intrinsic motivation. Socio-cognitive theory highlights the role of social interaction, observational learning, and self-regulation in shaping behavior and independent performance. Collectively, these theoretical frameworks provide complementary mechanisms for cultivating communication skills, autonomy, and adaptive competence. *Scientific novelty.* The study systematizes the contribution of three major learning theories to the conceptualization of soft skills development and clarifies their integrative potential in modern educational practice. *Practical significance.* The findings underscore the importance of selecting pedagogical strategies grounded in these theoretical approaches to effectively support the development of soft skills tailored to individual learners' needs.

Keywords: learning theories, constructivism, humanistic pedagogy, socio-cognitive theory, teaching methods, soft skills.

Introduction. In the context of accelerating digital transformation and global uncertainty, the development of soft skills has become a central priority in education and workforce preparation. Contemporary labor market analyses emphasize that automation and artificial intelligence are reshaping skill demands, increasing the importance of adaptability, complex problem solving, collaboration, and socio-emotional competencies (Arbués et al., 2025). Empirical evidence indicates that employers

increasingly value transferable skills alongside technical expertise, particularly in dynamic and technology-driven sectors (Heckman & Kautz, 2012). Consequently, education systems are expected to prepare learners not only with disciplinary knowledge but also with flexible competencies that enable lifelong learning and professional mobility.

The concept of soft skills encompasses communication, critical thinking, creativity, teamwork, emotional regulation, and self-management, all of which contribute to academic achievement and career success (Tan, 2025). Research has shown that these competencies are positively associated with improved academic performance, workplace readiness, and social integration. As a result, scholarly discourse has gradually shifted from a content-centered paradigm toward a holistic model of learner development that integrates cognitive, social, and personal dimensions.

Theoretical foundations for soft skills development are grounded in several major educational traditions. Constructivist theory posits that learners actively construct knowledge through interaction with their environment and prior experiences. Within this framework, collaborative learning and problem-based activities are considered effective mechanisms for fostering communication and critical thinking skills (Qureshi et al., 2023). Humanistic pedagogy, rooted in the works of Winarko & Budiwati (2024), emphasizes learner autonomy, self-actualization, and student-centered environments, thereby supporting motivation, self-regulation, and personal growth. Socio-cognitive theory highlights the reciprocal interaction between personal factors, behavior, and social context, underscoring the role of observational learning and self-efficacy in shaping competence development. These perspectives collectively provide conceptual support for designing educational practices that intentionally cultivate soft skills.

Recent advances in digital and immersive learning environments have further expanded opportunities for soft skills development. Technology-enhanced learning, including collaborative online platforms and virtual simulations, has been shown to promote engagement, communication, and problem-solving in authentic contexts (Utami & Hwang, 2022). However, despite the growing body of literature, systematic comparisons of how different theoretical paradigms contribute to soft skills formation remain limited. Many studies focus on specific instructional models or technologies, yet fewer attempt to integrate multiple theoretical lenses to provide a comprehensive understanding of pedagogical effectiveness.

Addressing this gap, the present study examines the influence of constructivist, humanistic, and socio-cognitive perspectives on the development of students' soft skills. By synthesizing key theoretical assumptions and their pedagogical implications, this research seeks to clarify how foundational learning theories can inform the design of educational strategies aimed at fostering transferable competencies in contemporary learning environments.

Materials and Methods. The study was designed as a qualitative theoretical investigation focused on clarifying how different pedagogical theories contribute to the development of students' soft skills. Rather than relying on empirical experimentation, the research drew upon analytical and interpretive procedures to examine conceptual foundations and their educational implications. The methodological approach included an in-depth review of scholarly literature, classification and comparison of pedagogical frameworks, conceptual synthesis, and the formulation of generalized theoretical inferences. This strategy made it possible to explore the explanatory and practical potential of various learning theories in relation to soft skills formation across diverse instructional settings.

The corpus of materials comprised authoritative national and international publications addressing both soft skills and contemporary educational theory. These sources included peer-reviewed journal

articles, academic monographs, doctoral and master's theses, policy analyses, and methodological recommendations. Priority was given to works published in reputable academic databases and indexing systems (Scopus, Web of Science, ERIC, and comparable scholarly repositories) to ensure academic rigor and relevance. The selection criteria were determined by the thematic alignment of the sources with the study's objective, namely, the examination of theoretical approaches that substantively influence the cultivation of soft skills. Particular emphasis was placed on constructivist perspectives that stress active and collaborative knowledge construction, humanistic approaches centered on personal growth and learner autonomy, and social-cognitive theory highlighting self-efficacy, observational learning, and the role of social interaction. In addition, applied methodological models derived from these theoretical traditions were reviewed to assess their practical significance in educational contexts.

The analytical procedure involved categorizing the selected studies according to their underlying theoretical orientation, identifying the fundamental pedagogical principles embedded within each framework, and evaluating their relevance to specific soft skills such as communication, critical thinking, creativity, collaboration, and emotional intelligence. Through systematic comparison and interpretive analysis, the research identified converging tendencies as well as distinctive contributions and limitations associated with each theoretical approach. The synthesis of these findings enabled the formulation of integrative theoretical conclusions and pedagogical recommendations regarding the effective incorporation of multiple theoretical perspectives into modern educational practice. Overall, the methodological design establishes a coherent conceptual foundation for subsequent empirical studies and for the development of instructional models aimed at the structured advancement of students' soft skills.

Results. The concept of soft skills originally emerged in managerial and corporate discourse to describe interpersonal abilities required for effective workplace interaction. Over time, its meaning has broadened considerably. In contemporary educational research, soft skills are commonly associated with an individual's capacity to navigate complex or uncertain situations, regulate emotional responses, and address personal and collective challenges constructively. Within the framework of the present study, soft skills are conceptualized as a set of integrative competencies - including critical thinking, collaboration, communication, and leadership - that are demonstrated in both individual and group problem-solving contexts.

In recent decades, the systematic development of soft skills has attracted growing scholarly attention across psychology, pedagogy, sociology, communication studies, and interdisciplinary educational research. At the same time, the search for effective instructional mechanisms has highlighted the importance of grounding pedagogical practice in established learning theories. The present analysis, therefore, focuses on three influential theoretical traditions: constructivism, humanistic pedagogy, and social-cognitive theory, and examines how their methodological principles contribute to the formation of soft skills. This theoretical emphasis is based on the premise that soft skills do not develop spontaneously; rather, they require deliberate instructional design informed by coherent conceptual foundations.

Constructivist Theory. A core principle of constructivist learning theory is that knowledge is actively constructed through learners' engagement with meaningful tasks and social interaction rather than transmitted in a ready-made form. Contemporary research continues to confirm that student-centered, inquiry-driven environments grounded in constructivist principles promote deeper conceptual understanding, critical thinking, and learner autonomy (Schunk, 2022). When students are provided with opportunities to

explore authentic problems, reflect on their experiences, and negotiate meaning collaboratively, they develop stronger self-regulation and intrinsic motivation. Conversely, instruction that limits active engagement may constrain the development of independent reasoning and cognitive flexibility. Within constructivist learning environments, several pedagogical conditions are considered essential. These include opportunities for learners to take responsibility for how they learn; engagement with multiple perspectives and alternative interpretations; immersion in authentic, real-world tasks; encouragement of active participation and self-expression; integration of collaborative social interaction; use of diverse representational formats (visual, auditory, textual, digital); and systematic reflection on the learning process itself. Together, these elements create a dynamic environment in which learners construct knowledge through experience and dialogue rather than through passive reception.

Education, in this perspective, is not limited to transmitting established truths; it aims to cultivate intellectual independence, problem-solving capacity, and continuous self-development. Because learners interpret reality through the lens of prior experiences, constructivism acknowledges variability in perception and understanding. Consequently, instructional practice must account for learners' backgrounds, perspectives, and cultural contexts.

Research within this tradition also suggests that new information is processed in relation to existing beliefs: learners may assimilate new ideas into prior frameworks or reject them if they appear incompatible. This insight underscores the importance of carefully structured learning tasks that encourage cognitive conflict, dialogue, and reconsideration of assumptions.

From a methodological standpoint, constructivist instruction is characterized by collective knowledge construction, shared authority between teacher and learners, redefinition of the teacher's role as a facilitator or guide, and the organization of learning activities in small collaborative groups. In such settings, emphasis shifts from teacher-centered explanation to learner-centered engagement. Knowledge is treated not as a fixed body of information to be memorized but as an evolving system of meanings that can be refined through interaction, reflection, and practical application.

In relation to soft skills development, constructivism offers clear advantages. Collaborative tasks promote communication and teamwork; inquiry-based activities strengthen critical thinking; authentic problem-solving enhances creativity and adaptability; and reflective practice contributes to metacognitive awareness. At the same time, the effectiveness of constructivist approaches depends on careful instructional planning and the creation of supportive learning environments that balance autonomy with guidance (Tam, 2000).

Table 1

Distinctions between non-constructivist and constructivist classroom environments

Traditional (Non-Constructivist) Classroom	Constructivist Classroom
The curriculum is structured around isolated components, with emphasis placed on foundational skills before addressing broader understanding.	Instruction begins with overarching concepts, which are gradually deepened through the integration of specific elements.
Strict compliance with a predetermined curriculum framework is considered essential.	Students' interests, inquiries, and learning needs are actively incorporated into the instructional process.
Teaching relies mainly on textbooks and standardized instructional materials.	A variety of resources are utilized, including primary documents, hands-on tools, and experiential materials.
The teacher assumes a directive and authoritative position in the classroom.	The teacher functions as a facilitator who promotes interaction, dialogue, and shared meaning-making.

Learning is largely based on memorization and repetitive practice.	Learning emphasizes active engagement and connects new information to learners' prior experiences.
Knowledge flows primarily from teacher to student in a one-directional format.	Teachers and students engage collaboratively in discussion, supporting learners in constructing understanding.
Evaluation focuses on correct responses measured through formal tests.	Assessment incorporates performance-based tasks, observation, reflection, and diverse student outputs.
The teacher is solely responsible for judging student achievement.	Both the learning journey and the outcomes are valued in the evaluation process.
Knowledge is treated as fixed and unchanging.	Knowledge is viewed as evolving and shaped by ongoing experience and reflection.
Students predominantly work independently on assigned tasks.	Collaboration and cooperative learning are central components of classroom practice.

This diversity in instructional practices can be conceptualized through three principal orientations: cognitive constructivism, social constructivism, and radical constructivism (Yakar et al., 2020), as summarized in Table 2 (McLeod, 2023).

Table 2

Characteristics of the Main Constructivist Approaches

Cognitive Constructivism	Radical Constructivism	Social Constructivism
Knowledge is actively formed through cognitive operations, including attention, perception, and memory processes.	Knowledge is constructed by the individual through subjective experience and interaction with the world.	Knowledge is created through social interaction and collaboration with others.
The teacher supports the learning process by designing conditions that encourage social interaction and collaborative engagement.	The learner is an active problem-solver who constructs knowledge through cognitive processes.	The learner is an active participant in knowledge construction, and learning is a social process.
The learner independently constructs knowledge and meaning, while personal reality is viewed as subjective and continuously shaped through experience.	The teacher prompts learners to critically examine and reflect on their personal experiences as a means of constructing knowledge.	The teacher provides information and informational resources that support learners in constructing their understanding.
Learning is a personal process shaped by cognitive functions, including attention, perception, and memory.	Learning is a personal and subjective process aimed at constructing meaning from one's own experience.	Learning is a social process that involves collaboration, negotiation, and reflection.
Reality exists objectively and independently of the learner, but the learner constructs their own understanding of it.	Reality is subjective and continuously evolving; there is no single objective reality.	Reality is socially constructed and subjective; there is no objective reality.

Cognitive Constructivism. The cognitive strand of constructivism is primarily associated with Jean Piaget, who conceptualized learning as an internally driven process grounded in logical reasoning and individual meaning-making. From this perspective, cognitive constructivism integrates personal interpretation with structured mental operations, linking constructivist principles to broader humanistic and behavioral dimensions of development. Piaget paid particular attention to psychological growth and examined how age, prior experience, and educational background shape the learning process.

A defining feature of Piaget's theory is its developmental orientation. He proposed that cognitive growth unfolds through qualitatively distinct stages, each

corresponding to specific age-related capacities. According to this view, a learner's ability to master particular cognitive operations is closely connected to their developmental level. Moreover, Piaget rejected the notion that knowledge is passively absorbed. Instead, he described learning as an active and evolving process in which individuals adapt to reality by formulating, testing, and refining hypotheses based on experience. Through ongoing interaction with the environment, learners reorganize their cognitive structures to achieve equilibrium between existing schemas and new information.

Because of its emphasis on internal mental construction and self-regulation, cognitive constructivism is often referred to as individual constructivism. It highlights the learner's personal identity, reflective self-assessment, and internal restructuring of knowledge frameworks. Within this paradigm, learning effectiveness depends largely on the learner's stage of cognitive development and readiness to integrate new information into existing mental models. Instructional strategies aligned with this approach, therefore, aim to activate prior knowledge, create cognitive conflict where appropriate, and guide learners in coherently reconstructing their conceptual understanding.

Radical constructivism. This was articulated by Sluzki (1976) and further elaborated by Steffe & Kieren (1994), who advance a more epistemologically rigorous interpretation of constructivist thought. It rests on several foundational propositions. First, knowledge is not transmitted intact through perception or communication; rather, it is actively generated by the individual knower. Second, cognition performs an adaptive function, enabling individuals to navigate and function effectively within their experiential environments.

Third, cognition does not seek to mirror an objective external reality but instead organizes subjective experience in a viable and coherent manner.

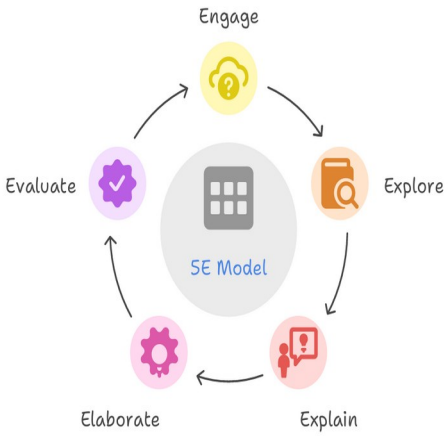
From this standpoint, learners continuously construct new understandings based on prior knowledge. However, such knowledge is not viewed as a direct representation of reality; instead, it serves as a functional tool that allows individuals to interpret and manage their lived experiences. Consequently, knowledge is inherently personal, context-bound, and open to revision. Radical constructivism thus underscores the subjective dimension of learning and emphasizes the importance of reflective awareness in the knowledge-construction process.

In contrast to the individual emphasis of cognitive and radical constructivism, social constructivism foregrounds the collective and interactive dimensions of learning. It conceptualizes knowledge construction as a socially mediated activity that unfolds through dialogue, collaboration, and participation in shared practices. Understanding emerges not solely from internal cognitive operations, but from engagement with teachers, peers, and the broader educational community.

Within this framework, the teacher's role shifts from that of information transmitter to that of facilitator and organizer of meaningful learning situations. By designing collaborative tasks, encouraging discussion, and structuring opportunities for joint problem-solving, educators create conditions that support learners in becoming active and autonomous constructors of scientific knowledge (Figure 1). Social constructivism, therefore, provides a strong theoretical foundation for the development of communication skills, teamwork, leadership qualities, and other socially embedded soft skills, as these competencies evolve most effectively within interactive learning environments (Saleem et al., 2021).

Figure 1

Stages of the "5E" Instructional Model



Engagement. Learners are actively involved in classroom learning activities by establishing connections between their prior and current learning experiences. At this stage, the instructor's role is to define the learning task and present the learning situation to learners.

Exploration. At this stage, the instructor designs learning activities and situations to provide both general and specific learning experiences. The primary goal of exploration tasks is to introduce a new topic or concept and to create learning experiences that can later be used for instruction and learning, such as discussion and skill acquisition. This stage involves learners' cognitive and physical engagement in recognizing specific situations, procedures, skills, and interactions.

Explanation. The explanation stage creates conditions for both the instructor and learners to clarify concepts, procedures, and skills related to the learning experience. This stage is often referred to as teacher-directed or direct instruction, as it supports learners in explaining the concepts and skills they explored during the previous stage.

Elaboration. After learners have explored and explained, they should be provided with additional experiences to extend, apply, and reinforce concepts and skills.

Evaluation. The teacher and learners work together to evaluate the completed work and the extent to which the new topic has been understood and learned. At this stage, the teacher assesses learners' understanding of key concepts using formal (tests or quizzes) and/or informal (exit tickets, oral presentations, etc.) assessment methods. Learners may also use self-assessment tools to evaluate their learning outcomes.

Throughout the process, learners collaborate to engage, explore, understand, and elaborate. At the same time, the teacher guides learners through the learning process and acts as a facilitator. This structured approach is effective for teaching STEM subjects such as mathematics and the natural sciences, as well as for introducing and exploring new concepts.

In recent years, due to the influence of the constructivist approach, the importance of integrating technology in schools has increased. In this regard, it is recommended to expand the number of studies in the field of educational technologies based on the constructivist approach.

Humanistic Pedagogy. The humanistic orientation of contemporary educational approaches brings about a reconfiguration of relationships among learners, the educational community, and institutional staff, emphasizing respect for the learner's individuality, rights, and freedoms. Within this paradigm, the learner is regarded as the central value of the educational process. Accordingly, the overarching purpose of education is to support the holistic development of the individual in the context of modern society, while its primary task is to encourage learners' pursuit of self-awareness, personal growth, and self-realization.

Humanistic pedagogy ensures the formation of a spiritually rich, active personality capable of creative self-realization and regards each child as an intrinsic value and a unique individual. It supports the learner's aspiration to be a free and independent person. In this context, the principle of unity of intellect and affect, the unity of activity, consciousness, and personality, as well as the recognition of each child as a self-valuing individual equal to adults in terms of rights and responsibilities, are emphasized.

The teacher's position, in turn, is characterized by freedom and creativity, consideration of each child's individual characteristics, and a positive attitude toward their spiritual development. The teacher-student relationship is oriented toward building open, sincere, and trusting interactions. At the same time, unconditional acceptance of the child and empathetic understanding are given primary importance. Humanistic pedagogy does not emphasize the transmission of accumulated experience but focuses on the child's own efforts and capabilities. It prioritizes reason over reliance on the social sphere, thereby affirming the primacy of consciousness over being and rejecting an impersonal approach to education.

Social-Cognitive Theory. In educational institutions, the foremost priority for the education system over the next seven years should be the establishment of a learning environment that not only raises the level of academic achievement, but also supports the development of a morally grounded, well-rounded individual equipped with key graduate competencies and capable of realizing creative potential within rapidly changing socio-economic conditions, both for personal fulfillment and for the benefit of Kazakhstani society.

The concept of *«self-regulated learning»* is also associated with the emergence of Bandura's social-cognitive theory. According to the researcher, behavior is shaped through the interaction of cognitive, behavioral, and environmental factors. In line with social-cognitive theory, the process of self-regulated learning is determined not only by learners' individual characteristics but also by their learning-related behaviors and environmental stimuli.

Social-cognitive learning theory seeks to explain how individuals acquire knowledge, beliefs, attitudes, and ways of thinking related to the social environment. Within the framework of this theory, Albert Bandura developed a model of self-efficacy expectations based on four primary sources of information: mastery experiences, vicarious experience, verbal persuasion, and physiological states (Table 3).

Table 3

Characteristics of Teaching Organization within Learning Theories

Learning Theory	Key Aspects	Types of Activities	Teaching Methods and Models
Constructivism	Learners' knowledge acquisition depends on the organization of learning through active experiences.	Problem-solving through group work, research activities, and active discussion.	Problem-based learning, cooperative learning, project-based learning, and case study.
Humanistic Pedagogy	Priority is given to considering each learner's individual psychological characteristics and interests within the learning process.	Instruction is organized with a small number of learners; learners may also be grouped into small teams.	Content and Language Integrated Learning (CLIL), gamification, flipped classroom, blended learning, collaborative learning, etc.
Social-Cognitive Theory	Learners acquire knowledge by independently searching for necessary information, adapting it to changing conditions, and finding solutions to problems.	Learning is effectively organized through research-based activities that require learners to generalize content and apply it to problem-solving situations.	5E instructional model, information selection and systematization, repetition of studied material, modeling, linking new material with prior knowledge, mnemonics, mapping, and affective methods.

The obtained results demonstrate that the integration of constructivist, humanistic, and socio-cognitive approaches creates favorable pedagogical conditions for the

systematic development of students' soft skills. The empirical and theoretical analysis indicates that active engagement, collaborative interaction, learner autonomy, and self-regulation function as interrelated mechanisms that strengthen communication, critical thinking, and problem-solving competencies. These findings not only confirm the pedagogical relevance of the selected theoretical frameworks but also justify the need for a comparative discussion of their alignment with recent international research, as presented in the following section.

Discussion. The findings of the present study align with recent empirical research emphasizing the role of constructivist-oriented pedagogies in fostering transferable competencies. Contemporary analyses published in Scopus- and Web of Science-indexed journals indicate that learner-centered and inquiry-based curricula significantly enhance critical thinking, collaboration, and problem-solving skills. Similar to our results, these studies demonstrate that structured collaborative tasks - such as group projects and peer interaction - promote communication skills and social engagement. However, while prior research has primarily examined constructivist practices within specific disciplinary contexts, our findings extend this perspective by comparatively analyzing multiple theoretical foundations and clarifying their complementary contributions to soft skills development. This integrative approach represents a key scientific contribution of the study.

Recent investigations also highlight the increasing role of digital and AI-supported environments in strengthening constructivist learning models. For instance, Farhood et al. (2025) found that adaptive learning systems enhance learner autonomy and self-regulation by personalizing instructional pathways. This observation supports the argument that future constructivist curricula may increasingly integrate artificial intelligence to tailor learning experiences based on individual cognitive and behavioral data. While earlier research has documented the benefits of personalization, our analysis emphasizes its theoretical coherence within constructivist and socio-cognitive paradigms, thereby contributing to a more conceptually grounded understanding of technology-enhanced soft skills formation.

Empirical evidence further confirms that structured programs grounded in constructivist and project-based principles contribute to measurable gains in leadership, communication, and analytical reasoning (Irwanto et al., 2022). These findings correspond with the results discussed in this study, particularly regarding the effectiveness of collaborative and inquiry-driven strategies. However, unlike many intervention-based studies that focus on short-term skill acquisition, our work underscores the importance of theoretical integration in ensuring the sustainability of soft skills development across educational levels.

Within the framework of humanistic pedagogy, recent scholarship has emphasized the importance of learner autonomy, intrinsic motivation, and values-oriented education in cultivating interpersonal competencies (Ryan & Deci, 2020). These studies support the argument that student-centered environments contribute to emotional intelligence and ethical responsibility. Our findings are consistent with this perspective, particularly in highlighting the role of personal meaning and internal motivation in soft skills formation. Nevertheless, while contemporary studies often operationalize humanistic principles through affective or motivational measures, the present analysis contributes by systematically linking these principles to broader theoretical constructs and educational design considerations.

The relevance of socio-cognitive theory is also substantiated by recent research demonstrating that self-efficacy, modeling, and co-regulated learning significantly predict collaborative competence and academic resilience (Panadero et al., 2019). In line with these findings, our discussion emphasizes that observational learning and self-regulation serve as foundational

mechanisms in soft skills development. The co-regulation framework proposed in recent educational psychology literature further illustrates how peer interaction activates cognitive and metacognitive processes essential for goal setting, planning, and reflective practice (Hadwin et al., 2011). Compared to existing empirical studies that examine these constructs separately, the present study offers a theoretically integrated perspective, positioning self-regulation and social interaction as interconnected dimensions within a unified developmental model.

Overall, the comparative analysis reveals both convergence and divergence across theoretical paradigms. Constructivist and socio-cognitive approaches converge in emphasizing active engagement and social interaction, whereas humanistic pedagogy uniquely foregrounds personal growth and value formation. The scientific value of the present study lies in synthesizing these perspectives and articulating their complementary roles in shaping soft skills within contemporary educational environments. By situating the discussion within recent international scholarship, this work contributes to the ongoing discourse on theoretically grounded and evidence-based strategies for transferable competence development.

Conclusion. Contemporary educational policy highlights the relevance of developing soft skills. This article examines the impact of constructivism, humanistic pedagogy, and social-cognitive theory on the development of soft skills. These learning theories have been the subject of numerous theoretical and empirical studies within the social sciences, explored from diverse perspectives across fields such as education, communication, management, and related domains. In the present study, the core ideas and prominent strands of the aforementioned learning theories were analyzed. In addition, teaching methods that contribute to effective knowledge construction in the process of their implementation were specified, and the influence of these theories on soft skills development was examined.

The findings indicate that the application of diverse theoretical approaches provides opportunities to achieve positive outcomes in soft skills development. In particular, constructivist theory promotes the formation of soft skills such as teamwork, communication, and leadership through learners' active engagement in learning activities. Humanistic pedagogy contributes to unlocking learners' internal psychological and spiritual potential. Social-cognitive theory offers strong potential for developing soft skills through social interaction, observation, self-efficacy, and self-regulation. The integrated and context-sensitive application of these theories, aligned with learners' characteristics, enables the development of a scientifically grounded and effective methodology for soft skills development.

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Innovative Facilitative Technology for Psychological and Pedagogical Support of Adolescents' Emotional and Behavioral Development

Abstract

Introduction. The article addresses the development and substantiation of an innovative facilitative technology for psychological and pedagogical support of adolescents' emotional and behavioral development. The study's relevance stems from increasing emotional and behavioral instability among students with mental developmental delay (MDD), requiring comprehensive, scientifically grounded corrective approaches that traditional methods fail to provide. *Methodology and Methods*. The methodological framework integrates cultural historical theory, principles of the facilitative approach, and contemporary concepts of emotional and behavioral development in adolescents with Major Depressive Disorder. Methods include psychological and pedagogical diagnostics, implementation of experimental technology, pedagogical observation, expert evaluation, and qualitative and quantitative data analysis. *Results*. The three-module facilitative technology demonstrated effectiveness through increased emotional awareness, reduced impulsive and aggressive behaviors, and formation of stable adaptive patterns. Statistically significant positive dynamics in emotional and behavioral development of adolescents with MDD were confirmed. *Scientific novelty*. The study conceptualizes the facilitative approach as integration of emotional-cognitive, behavioral, and social-communicative strategies into unified technology, identifying criteria and indicators for dynamics of emotional-behavioral regulation essential for personalized corrective intervention trajectories. *Practical significance*. The technology provides a comprehensive tool for psychological and pedagogical support systems, including: a support program fostering emotional resilience and correcting behavioral difficulties; a game-based practicum for emotional and behavioral development (GPEBD) targeting negative emotional states; functional modules adapted to MDD characteristics; and an indicator map enabling individualized corrective interventions.

Keywords: innovative facilitative technology; emotional and behavioral development; mental developmental delay; adolescence; corrective and developmental intervention.

Introduction. The current stage of educational development is characterized by an increasing emphasis on strengthening systems that ensure adolescents' emotional and behavioral well-being. This trend is associated with heightened psychological demands in school, the growing frequency of behavioral difficulties, and a decrease in students' resilience to stressors.

Adolescence is a sensitive period for the formation of emotional regulation and stable behavioral patterns that significantly

influence subsequent personal development and social functioning. In Kazakhstan, the need for systematic psychological and pedagogical support is reinforced by the fact that a substantial proportion of schoolchildren experience persistent difficulties in mastering educational programs, and a notable share demonstrate emotional and behavioral deviations requiring targeted professional assistance (Ministry of Education of the Republic of Kazakhstan, 2022). Emotional maladjustment during adolescence negatively affects academic engagement, peer interaction, and personal maturity, thereby increasing the risk of school disadaptation and secondary behavioral complications. Accordingly, contemporary educational practice prioritizes technologies aimed at strengthening emotional resilience, developing self-regulation and empathy, and forming constructive behavioral strategies.

One promising direction in school-based support is the facilitative approach, which focuses on creating developmental conditions that enable adolescents to actively and progressively cope with emotional and behavioral difficulties. However, despite the availability of individual corrective and developmental methods, educational practice still lacks integrated technologies that combine facilitation with systematic work on emotional and behavioral development, particularly in inclusive settings. This gap is especially evident when working with adolescents with mental developmental delay (MDD), whose emotional reactivity, reduced self-control, and difficulties in adaptive behavior require not fragmented measures, but a comprehensive and staged intervention.

Recent research indicates that multimodal, practice-oriented, and technology-enhanced formats significantly increase the effectiveness and stability of corrective outcomes in adolescents' emotional and behavioral development (van Balkom et al., 2010; Beauchaine, 2015; Tang & Chu, 2023; Bernthal et al., 2017; Kharbat et al., 2021; Drigas & Ioannidou, 2012; Grigorova & Ristovska, 2021; Law, 2015). At the same time, the majority of studies are focused on isolated manifestations (anxiety, aggressiveness, emotional instability) or on narrow developmental domains, whereas integrated facilitative technologies targeted at the systematic formation of emotional and behavioral regulation in adolescents with MDD remain insufficiently developed and empirically tested. This methodological and practical deficit determines the relevance of the present study.

Therefore, the purpose of this research is to develop and substantiate an innovative facilitative technology for the psychological and pedagogical support of adolescents' emotional and behavioral development in mainstream schools and to evaluate its effectiveness using diagnostic and outcome indicators.

Research hypothesis: If an innovative facilitative technology based on the integration of diagnostic, facilitative, preventive, and corrective-developmental procedures is developed and implemented, then adolescents with mental developmental delay (MDD) will demonstrate increased emotional awareness, a reduction in the intensity of negative emotional and behavioral manifestations, and the formation of more constructive and adaptive behavior strategies.

Research objectives: To theoretically substantiate the structure and content of the innovative facilitative technology aimed at adolescents' emotional and behavioral development; To determine criteria and tools for assessing the dynamics of emotional and behavioral regulation in adolescents with mental developmental delay (MDD), implement the technology in educational practice, and evaluate its effectiveness.

Materials and Methods. The study employed a quantitative quasi-experimental research design with a pre-test and post-test assessment. The research was aimed at evaluating the effectiveness of an innovative facilitative technology for psychological and pedagogical support of adolescents' emotional and behavioral development in mainstream school settings. The quasi-experimental design was chosen due to the

ethical and organizational constraints associated with random assignment in educational environments and is widely used in applied psychological and pedagogical research.

Participants. The empirical study was conducted in secondary schools of Almaty, Kazakhstan (Schools №16, 20, 28, 64, 91, 116, and 133). The sample consisted of 165 adolescents aged 11–13 years. Participants were identified as adolescents with mental developmental delay (MDD) based on conclusions provided by school psychological services and psychological-medical-pedagogical commissions.

The formation of the study groups was based on the principle of comparability with respect to age and baseline indicators of emotional and behavioral functioning. Adolescents were distributed into a control group and two experimental groups. At the initial stage of the study, no statistically significant differences between the groups were identified, which ensured the validity of subsequent comparative analysis.

Data Collection Tools. To assess the dynamics of emotional and behavioral development, a set of standardized and widely used diagnostic tools was employed:

1) Indicator Map of Negative Emotional States (Chernukhina, 2002), used to identify and quantify the intensity of negative emotional manifestations (anxiety, fear, resentment, aggression, emotional tension, sadness);
2) Personal Anxiety Scale for Adolescents (Prikhozhan, 2000), applied to assess age-specific characteristics of personal anxiety;
3) School Anxiety Test (Phillips, 1970), aimed at identifying anxiety associated with educational situations;
4) Vineland Adaptive Behavior Scales, used to evaluate adaptive functioning, including communication skills, socialization, and daily living skills;
5) Tapping Test (Osnitsky, 1998), applied to assess neurodynamic characteristics and work capacity;
6) Bass–Darky Questionnaire, used to identify the level and forms of aggressive and self-aggressive behavior.

The selected instruments ensured a comprehensive assessment of both emotional and behavioral domains and allowed for the evaluation of adaptive functioning as a key outcome of psychological and pedagogical intervention.

The study was conducted in three consecutive stages. At the diagnostic stage, baseline indicators of emotional and behavioral functioning were assessed in all groups. At the formative stage, the innovative facilitative technology was implemented in the experimental groups. The technology consisted of three interrelated modules: a diagnostic module, a facilitative-developmental module, and an outcome assessment module. The intervention included structured facilitative practices, game-based activities, scenario and role-play methods, and targeted exercises aimed at developing emotional awareness, self-regulation, and adaptive behavior. At the control stage, repeated diagnostics were carried out to assess changes in emotional and behavioral indicators and to evaluate the effectiveness of the implemented technology.

Data Analysis Technique. Statistical data processing was performed using SPSS Statistics software. Descriptive statistics were used to summarize baseline characteristics of the sample. Comparative analysis of pre- and post-intervention indicators was conducted to identify changes in emotional and behavioral functioning. The statistical significance of differences was evaluated at a confidence level of $p < 0.05$, which is standard for psychological and pedagogical research.

Results. The control (evaluation and analytical) stage of the study was conducted to assess the effectiveness of the innovative facilitative technology for the psychological and pedagogical support of adolescents with mental developmental delay (MDD). The analysis focused on two key domains: 1) emotional functioning and 2) behavioral and adaptive functioning.

Emotional functioning. Changes in adolescents' emotional states were assessed using the Indicator Map of Negative Emotional States. Comparative analysis of pre- and post-intervention data demonstrated a positive dynamic in the experimental groups. As shown in Table 1, the number of adolescents experiencing pronounced negative emotional states, including aggression, resentment, emotional tension, fear, anxiety, and sadness, decreased following the formative experiment.

Table 1

Assessment of adolescents' emotional states using the Indicator Map of Negative Emotional States (NES)

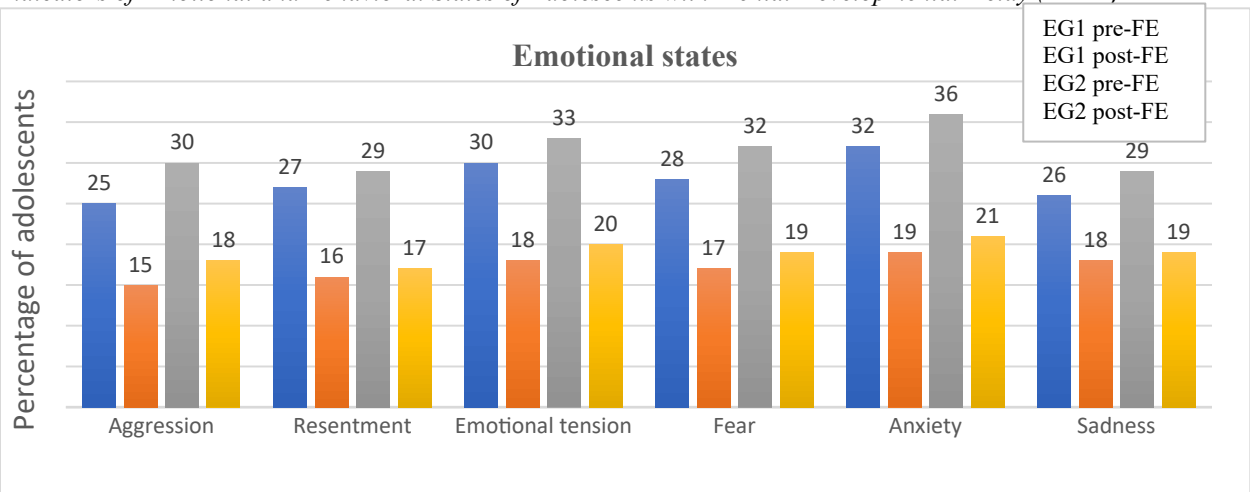
№	Emotional states	Number of adolescents experiencing negative emotional states (NES)				
		CG	EG 1		EG 2	
			before (FE)	after (FE)	before (FE)	after (FE)
1	Aggression	8	25	15	30	15
2	Resentment	9	26	16	29	14
3	Emotional tension	7	23	15	32	16
4	Fear	9	21	15	34	16
5	Anxiety	11	17	13	38	28
6	Sadness	16	27	22	28	21

Table 1 presents quantitative changes in emotional state indicators across the control and experimental groups before and after the implementation of the facilitative technology. The most pronounced reductions were observed in indicators of anxiety, aggression, and emotional tension in the experimental groups. Further analysis revealed that emotional tension, which is considered a key marker of emotional maladjustment in adolescents with MDD, was significantly reduced after the intervention. Visual comparison of emotional and behavioral indicators confirms this trend (Figure 1).

As illustrated in Figure 1, adolescents in the experimental groups demonstrated a normalization of emotional background, a decrease in the intensity and frequency of negative emotional experiences, and an increase in emotional awareness. These changes indicate the development of more stable emotional regulation mechanisms.

Figure 1

Indicators of Emotional and Behavioral States of Adolescents with Mental Developmental Delay (MDD)

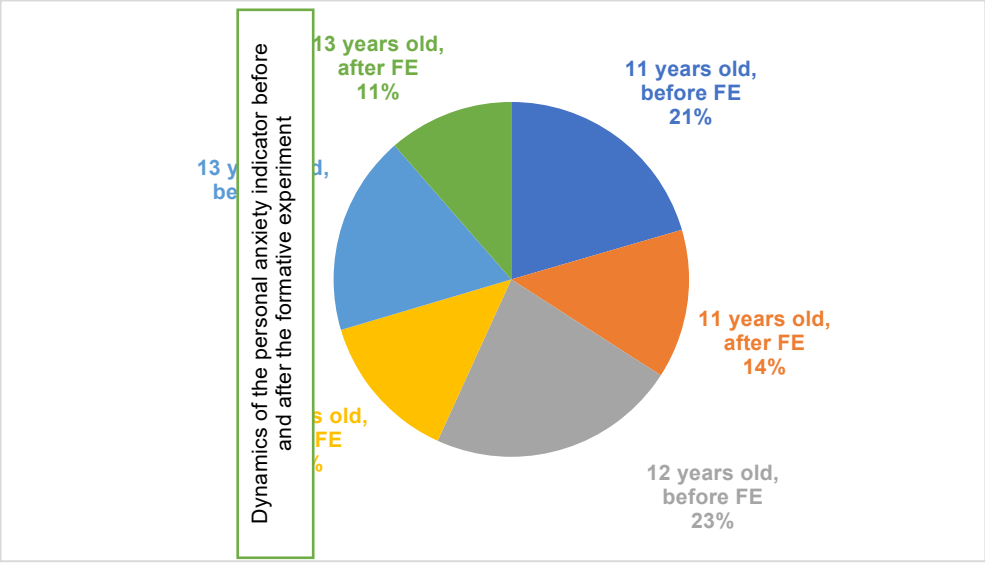


Anxiety indicators. To assess age-related dynamics of anxiety, repeated diagnostics were conducted using the Personal Anxiety Scale for Adolescents and the School Anxiety Test. The results of the comparative analysis are presented in Figure 2.

As shown in Figure 2, the implementation of the facilitative technology led to a reduction in anxiety levels across all age groups. In 11-year-old adolescents, a more pronounced decrease in situational anxiety was observed, whereas in 12- and 13-year-olds, reductions were noted in both personal and school-related anxiety.

Figure 2

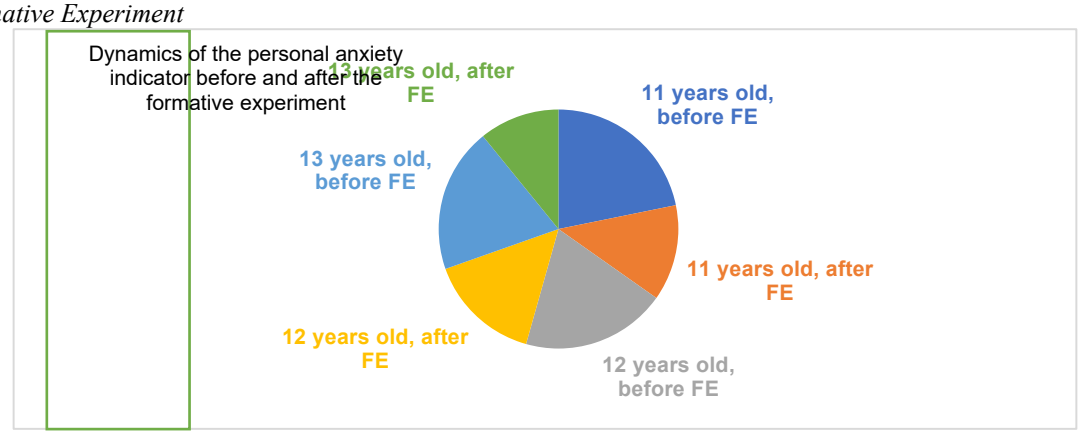
Dynamics of Personal Anxiety Indicators in Younger Adolescents with Mental Developmental Delay (MDD) in Experimental Groups Before and After the Formative Experiment



The dynamics of self-assessed anxiety are presented in Figure 3. Before the intervention, the highest levels of self-assessed anxiety were recorded among 12-year-old adolescents, which corresponds to the peak of school-related emotional tension. Following the formative experiment, a statistically significant decrease in self-assessed anxiety was observed across all age groups, with the most substantial changes occurring in the 12-year-old group.

Figure 3

Dynamics of Self-Assessed Anxiety in Adolescents with Mental Developmental Delay (MDD) Before and After the Formative Experiment



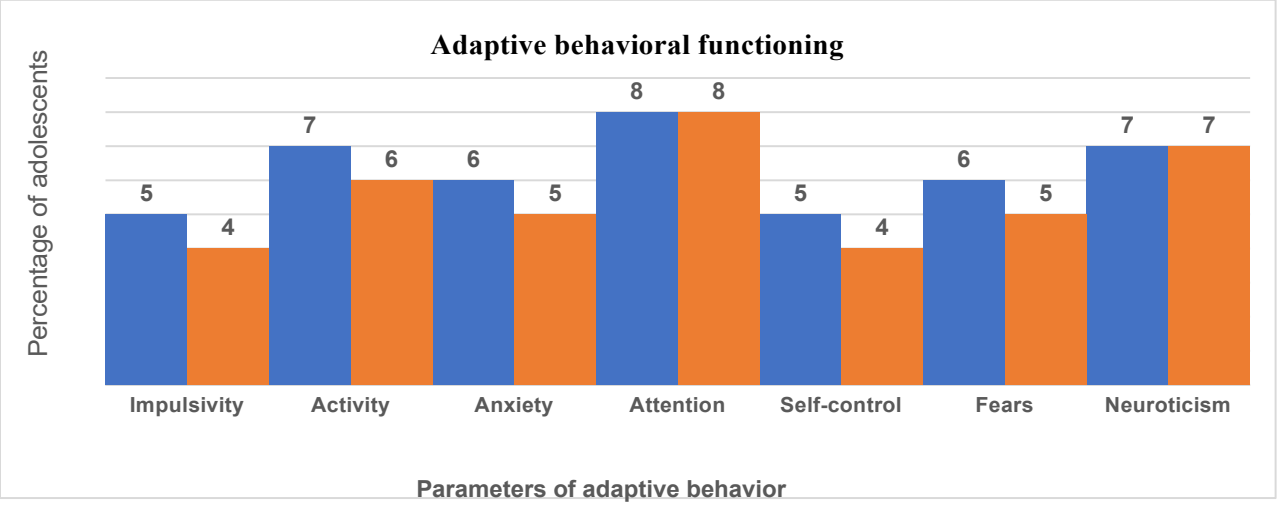
Behavioral and adaptive functioning. The second criterion for evaluating the effectiveness of the facilitative technology was the assessment of behavioral and adaptive functioning. Adaptive behavior was examined using the Vineland Adaptive Behavior Scales.

Post-intervention results demonstrated improvements in key domains of adaptive functioning, including communication,

socialization, and daily living skills. Comparative analysis of maladaptation indicators is presented in Figure 4, which illustrates differences between the control group and adolescents with MDD after the formative experiment.

Figure 4

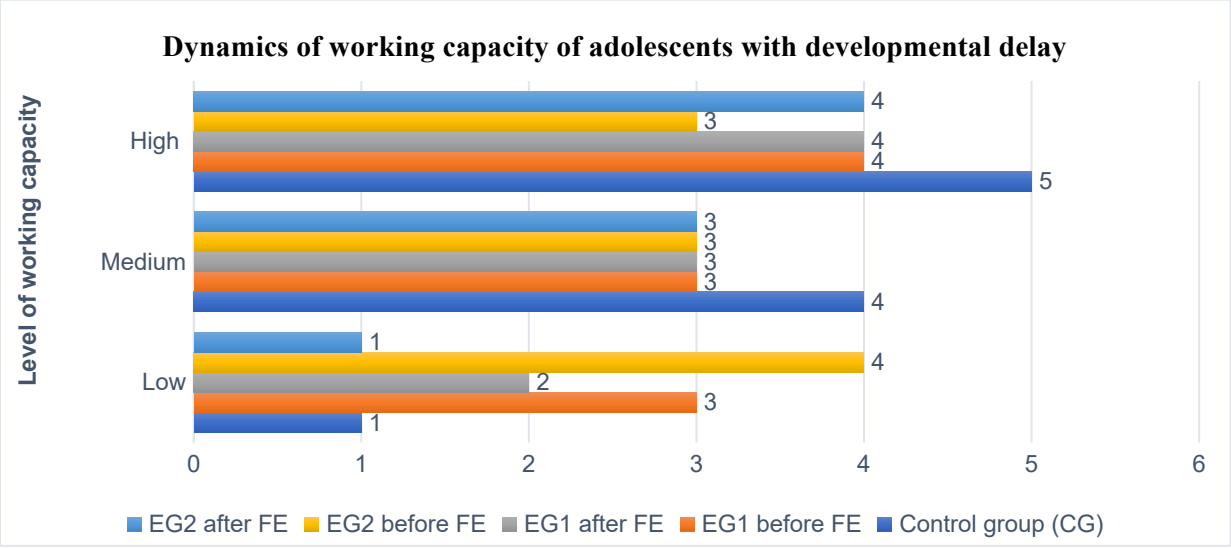
Mean Indicators of Behavioral and Adaptive Functioning



Additional assessment of regulatory efficiency and work capacity was conducted using the Tapping Test. The results, presented in Figure 5, indicate a positive transition dynamic: adolescents who initially demonstrated critical levels of work capacity progressed to acceptable levels, while those at acceptable levels reached optimal performance indicators.

Figure 5

Dynamics of Changes in Work Capacity of Adolescents with Mental Developmental Delay (MDD) After the Formative Experiment (Tapping Test)



Discussion. The obtained results confirm the effectiveness of the innovative facilitative technology as a comprehensive tool for supporting adolescents' emotional and behavioral development in mainstream educational settings. The observed reductions in anxiety, emotional tension, and aggressive manifestations are consistent with contemporary findings emphasizing the effectiveness of multimodal and facilitative

interventions in school-based psychological support (Beauchaine, 2015; Tang & Chu, 2023).

The pronounced decrease in emotional tension and anxiety, particularly among 12-year-old adolescents, supports the view that facilitative and development-oriented interventions are most effective during periods of heightened emotional vulnerability. Similar age-specific effects have been reported in studies examining emotional regulation and school anxiety in adolescents with developmental difficulties (Drigas & Ioannidou, 2012; Grigorova & Ristovska, 2021).

Improvements in adaptive functioning, as evidenced by the Vineland Adaptive Behavior Scales, indicate that the facilitative technology contributes not only to the correction of negative emotional manifestations but also to the formation of socially adaptive behavior patterns. This finding aligns with research highlighting the importance of integrated emotional-behavioral interventions for enhancing social competence and self-regulation in adolescents (Law, 2015; Kharbat et al., 2021).

The transition dynamics observed in work capacity and regulatory efficiency further suggest that the technology supports the gradual development of voluntary activity regulation. These results confirm that the facilitative approach enables a shift from a corrective-deficit paradigm to a facilitative-developmental model, emphasizing adolescents' internal resources and active participation in the regulation of their emotional and behavioral states.

Conclusion. The dynamic nature of the innovative facilitative technology for the psychological and pedagogical support of adolescents' emotional and behavioral development is reflected in its adaptability and flexibility. The technology does not function as a static set of corrective procedures, but as an adaptive system that takes into account individual emotional and behavioral profiles of adolescents, as well as the changing conditions of the educational environment. The findings of the present study confirm the feasibility and effectiveness of implementing this technology within mainstream schools as part of a comprehensive system of psychological and pedagogical support.

The methodological integration of pedagogical, psychological, and corrective-developmental approaches constitutes a key strength of the proposed technology. By combining diagnostic procedures, facilitative interventions, preventive elements, and outcome assessment within a unified technological cycle, the developed model ensures a systemic and multi-level influence on adolescents' emotional and behavioral functioning. This approach contributes to the development of emotional resilience, self-regulation skills, adaptive behavioral strategies, and social competence in adolescents with mental developmental delay (MDD). The results obtained have both theoretical and practical significance. From a theoretical perspective, the study expands current understanding of the mechanisms underlying emotional and behavioral regulation in adolescents with MDD and substantiates the effectiveness of facilitative technologies as a developmental alternative to deficit-oriented corrective models. The findings also contribute to the methodological discourse on school-based interventions by demonstrating the value of integrated and modular approaches in inclusive educational settings.

From a practical perspective, the proposed facilitative technology can be effectively integrated into the system of psychological and pedagogical support in educational institutions. Its modular structure allows for adaptation to the specific needs of different student groups, school contexts, and stages of adolescence. The technology may be used by school psychologists, teachers, and multidisciplinary support teams as a structured program aimed at reducing emotional maladjustment, preventing behavioral difficulties, and fostering adaptive functioning. Despite the positive results, the study has certain limitations, including the restricted regional scope of the sample and the

absence of long-term follow-up data. These limitations outline the directions for future research, which may focus on expanding the sample, conducting longitudinal assessments of intervention outcomes, and examining the applicability of the technology in diverse educational contexts.

In conclusion, the developed innovative facilitative technology represents an effective and scientifically grounded tool for optimizing the emotional and behavioral development of adolescents with mental developmental delay (MDD). Its implementation contributes to the formation of adaptive behavioral strategies, emotional stability, and psychological well-being, thereby enhancing the quality and effectiveness of psychological and pedagogical support within the modern education system.

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Development of Students' Research Skills Through STEM Education (Survey Results)

Abstract

Introduction. The study examines the development of research competencies among students through the integration of innovative STEM-based pedagogical approaches in geography education. In response to societal demand for digitalization and preparation of learners for complex interdisciplinary problem solving, the research provides theoretical substantiation and experimental validation of STEM methodology effectiveness in fostering research skills among seventh-grade students during geography lessons. *Methodology and Methods.* A quasi-experimental design involved one hundred sixty-one respondents, including twenty-seven students from a secondary educational institution. Data collection employed a structured, closed-ended questionnaire containing five items that assessed frequency of research task implementation, student interest in technological approaches, preferences regarding project formats, and perceived didactic effectiveness of STEM integration. The survey followed bioethics principles with informed consent obtained from participants and guardians. Quantitative analysis included frequency distribution and correlation analysis of the respondents. *Results*. The results indicate limited systematic use of research tasks in current educational practice, while strong student interest in STEM integration in geography education is observed. Student responses demonstrate recognition of the positive influence of STEM-based approaches on the development of research competencies, improved comprehension, and stronger retention of learning material. STEM integration is associated with increased engagement in technology-enhanced learning and collaborative project-based activities. *Scientific Novelty*. Empirical evidence demonstrates that systematic application of STEM methodology provides an effective model for transforming geography instruction from knowledge transmission toward inquiry-oriented learning and strengthening research skill development among secondary students. *Practical significance.* Findings support implementation of STEM-enhanced geography curricula to strengthen research competencies among early adolescents and provide recommendations for expanding research-oriented tasks through interdisciplinary project design, technological tool integration, and structured mentoring of student investigations.

Keywords: STEM education, research skills, practice-oriented tasks, secondary school students.

Introduction. In the context of the rapid transformation of the global socio-economic and ecological landscape (Peter & Sprenger, 2022), accompanied by unprecedented contemporary challenges ranging from accelerating climate change and ecosystem degradation to imperatives of sustainable resource management and societal digitalization (Haefner & Sternberg, 2020) the development of research competencies

has acquired the status of a significant educational objective (Mamirova, 2024). The capacity for systematic engagement with heterogeneous information arrays, formulation and verification of hypotheses, application of quantitative and qualitative data analysis methods, as well as the generation of innovative solutions to interdisciplinary problems, constitutes the core of a competency profile for graduates commensurate with the demands of a knowledge-based economy and the challenges of sustainable development. Geography as a scientific discipline possesses a unique epistemological status (Baerwald, 2010), functioning as an integrative platform for studying complex spatially-organized territorial systems operating at the intersection of natural, social, and economic processes, thereby predetermining its exceptional potential for fostering research-based thinking. The dominant paradigm in contemporary geographical pedagogy maintains a reproductive-informational character, oriented primarily toward the transmission of descriptive knowledge and mechanical reproduction of factual material, which significantly constrains the development of students' independent research skills, critical evaluation of information, and analytical thinking (Feulner, 2014). The contradiction between the objective didactic potential of geography education and its actual implementation in the educational process underscores the necessity for seeking and implementing innovative pedagogical strategies, among which STEM-based approaches hold particular significance as an integrated methodology (English, 2016; Sutaphan & Yuenyong, 2019) that synthesizes natural science, technological, engineering, and mathematical knowledge in the context of addressing practice-oriented research tasks.

Research objective: To theoretically substantiate and experimentally verify the effectiveness of STEM-education methods for developing research skills among seventh-grade students in geography lessons. Within the framework of the present study, research skills of seventh-grade students are defined (Mamirova, 2024) as an integrated complex of developing cognitive abilities and operational competencies oriented toward independent or pedagogically-guided cognition of geographical reality objects and processes through identification of problematic situations, generation of research questions, and their systematic resolution. Skills constitute not a mechanical aggregate of discrete operations, but rather a holistic system of cognitive activity adequate to the cognitive capacities and psychophysiological characteristics of adolescence, distinguished by intensification of abstract-logical thinking, enhancement of intellectual autonomy, and formation of the foundations of scientific-theoretical cognitive style.

The structural organization of students' research skills is operationalized through a system of interconnected components (Meerah & Arsad, 2010). The first component represents the ability to generate hypotheses, consisting of the capacity, based on primary empirical observation and analysis of available information, to construct hypothetical, logically substantiated judgments concerning causal relationships between geographical objects and processes, as illustrated by formulations such as: with intensification of forest cutting on slope territories, an increase in the frequency of landslide phenomena is anticipated. The second component encompasses the ability to design research, including the development of an algorithmized sequence of actions for hypothesis verification through determination of target objectives, implementation stages, necessary instrumentation (cartographic materials, measuring instruments, statistical data), methods of information collection, and prediction of anticipated outcomes. The third component constitutes the ability to accumulate and document data, presupposing mastery of basic techniques for empirical information collection: implementation of systematic observations (meteorological parameters), work with existing information arrays (climatic, demographic databases), application of geoinformation technologies

(GPS navigation, digital cartography), and accurate recording of obtained results in tabular, graphic, and schematic formats. The fourth component forms the ability to analyze and interpret data, expressed in the capacity to process collected information through procedures of comparison, classification, identification of patterns, trends, and deviations, which ensures transition from descriptive account of facts to their causal explanation through the establishment of correlations between various parameters (temperature regime, barometric pressure, and synoptic situation). The fifth component represents the ability to formulate conclusions, consisting of the capacity, on the basis of conducted analysis, to construct conclusions directly addressing the initial research question and confirming or refuting the original hypothesis, provided that conclusions are substantiated by empirical data and their conceptual generalization. The aforementioned system of interconnected components, adapted to the substantive content of the seventh-grade geography curriculum (study of physico-geographical characteristics of continents and oceans, spatial patterns in population distribution and economic activity), serves as the object of diagnosis and purposeful development in the process of experimental implementation of a STEM-oriented pedagogical model.

The methodology of STEM-education constitutes an integrated pedagogical system (Oyana et al., 2015; Caldis & Kleeman, 2019) synthesizing the epistemological foundations and methodological apparatus of four interrelated knowledge domains: natural sciences (Science), technology (Technology), engineering (Engineering), and mathematics (Mathematics). The conceptual core of this methodology is revealed through a system of fundamental principles. The principle of integration presupposes overcoming the disciplinary fragmentation of traditional education and constructing a holistic cognitive model in which geographical knowledge is organically integrated with physical, chemical, and biological regularities, operationalized through mathematical modeling, and realized through application of contemporary technological tools. The principle of project-based activity determines the organization of the educational process around solving a complex interdisciplinary problem in the format of an integrated project, encompassing the complete research cycle from the identification of a problematic situation and the design of a solution to its materialization, testing, and presentation of results. The principle of practice-oriented problem-solving determines the substantive foundation of instruction through engagement with authentic contextualized problems possessing social and ecological significance (assessment of anthropogenic pollution levels in water bodies, design of water treatment systems, optimization of transportation routes considering geomorphological characteristics of the territory).

Geography, as a scientific discipline studying spatiotemporal systems in their complex interaction, possesses exceptional potential for realizing STEM methodology (Caldis & Kleeman, 2019). The synthetic nature of geographical knowledge manifests through multiple aspects of integration. The technological dimension is realized through the application of geoinformation systems for spatial analysis, the interpretation of remote sensing imagery for landscape transformation monitoring, the use of satellite navigation systems in field research, and the creation of interactive cartographic visualizations. The engineering dimension is actualized in the context of developing nature conservation solutions: design of anti-erosion structures, modeling of aquatic ecosystem rehabilitation systems, and construction of renewable energy installations accounting for regional physico-geographical factors. The mathematical dimension is represented through procedures of statistical data processing (calculation of demographic density, urbanization rates), construction and interpretation of graphic models (climatic diagrams), operations with cartographic scales, coordinate systems, and determination

of metric and areal characteristics of territories.

The substantive content of the seventh-grade geography curriculum, focusing on the study of physico-geographical complexes of continents and oceans, provides significant opportunities for implementation of STEM methodology (Al Mamun et al., 2015). The thematic unit devoted to the atmosphere and Earth's climatic systems integrates natural scientific study of physicochemical mechanisms of precipitation formation and the greenhouse effect, technological application of digital meteorological stations and online platforms for meteorological data collection, engineering design of an automated greenhouse model adapted to a specific climatic zone, and mathematical construction and analysis of climatograms with calculation of mean daily and mean monthly temperature indicators. The thematic unit on the hydrosphere and World Ocean waters encompasses natural scientific investigation of physicochemical properties of water, mechanisms of oceanic current formation and hydrological cycle processes, technological analysis of satellite imagery to track deglaciation dynamics and anthropogenic aquatic pollution, engineering construction of a filtration installation with assessment of its effectiveness, and mathematical calculations of salinity, river discharge, and current velocities. The thematic unit on natural zones presupposes natural scientific investigation of functional relationships in natural-territorial complexes (soil cover, vegetation, climatic conditions), technological application of geoinformation systems for mapping and analyzing transformation of natural zone boundaries, engineering development of projects for biological diversity conservation and desertification mitigation, and mathematical comparative statistical analysis of biodiversity indicators across various zones and quantification of anthropogenic impact area.

The integration of STEM methodology (Chattopadhyay & Biswas, 2024) into the seventh-grade geography curriculum ensures the transformation of descriptive material assimilation into active research and project-based activity purposefully oriented toward the development of subject-specific competencies and cross-disciplinary universal learning actions. The implementation of STEM methodology in school geographical education (Lindner et al., 2019) is operationalized through a system of pedagogical technologies and forms of educational activity purposefully oriented toward the development of structural components of research skills. About the seventh-grade geography curriculum, the following practice-oriented approaches are considered relevant.

The technology of working with geoinformation systems and remote sensing of Earth constitutes an instrumental framework for developing competencies in the accumulation, analysis, and interpretation of spatial data. In the course of educational projects, students conduct comparative analysis of multitemporal satellite imagery to identify dynamics of anthropogenic landscape transformation in Kazakhstan, including quantitative assessment of the contraction of the Aral Sea, desertification processes in the Ustyurt region, vegetation cover degradation in steppe ecosystems, or expansion of urbanized territories exemplified by the megacities of Almaty and Astana, requiring generation of hypotheses regarding causal factors of observed changes, data verification through multiple sources, and construction of substantiated conclusions, which constitutes the essential content of the research process.

Projects modeling climatic processes through the application of digital simulators and construction of simplified physical models (representation of the greenhouse effect) ensure the transformation of receptive assimilation of theoretical concepts into active experimentation. By manipulating variable parameters (carbon dioxide concentration, albedo of the underlying surface), students empirically establish causal relationships determining global climatic patterns, thereby developing skills in

designing virtual experiments and analytical processing of their results.

Resolution of engineering tasks in the context of environmental management and sustainable resource use is realized through design and creation of functioning models of installations for water purification from anthropogenic pollutants, which integrates chemical knowledge of coagulation and adsorption processes, physical principles of filtration and biological mechanisms of biofiltration, actualizing the phases of planning and construction, presupposing quantification of the effectiveness of the proposed solution and its empirical testing, fostering development of systemic engineering thinking and competencies for practical resolution of multidisciplinary problems.

Organization of field research employing portable digital sensors for measuring physicochemical parameters of the environment (pH and turbidity indicators of water in local water bodies, temperature-humidity regime in various biotopes) transforms the traditional educational excursion into a full-fledged scientific investigation. Students accumulate empirical data in real time, perform their statistical processing, and interpret obtained results in the context of natural and anthropogenic factor impacts, thereby directly developing competencies in quantitative information collection and analysis. The presented system of STEM practices ensures not fragmentary, but rather comprehensive engagement of students in the research process, where technological instrumentation, natural scientific knowledge, and mathematical apparatus function not as autonomous educational objectives, but as integrated means for solving relevant geographical tasks possessing cognitive and practical significance.

Materials and Methods. The subject of the research was the development of research skills among students through the means of integrating technological and engineering approaches (STEM-education) into the process of geography instruction. The objective of the survey was to identify the potential of STEM approaches in developing research competencies of students in geography education, as well as to determine the degree of students' readiness for participation in research activity and their motivational-value attitudes toward integration of technological methods into geography education.

Participants. The study involved 27 seventh-grade students (average age 13–14 years) enrolled in a general education institution. The selection of this age group was determined by the following factors: first, seventh grade corresponds to a transitional period in the development of educational-cognitive activity, when students are capable of complex forms of abstract thinking and prepared for independent investigations; second, the geography curriculum in seventh grade contains sufficient material allowing application of comprehensive STEM-approaches; third, this age period is characterized by high receptiveness to innovative teaching methods.

Criteria for participant selection included: enrollment in seventh grade at the time of the study, regular attendance at geography lessons, consent to participate in the survey, and availability of access to educational materials and resources for completing research assignments. For data collection, a closed-ended questionnaire consisting of five main questions was administered, aimed at identifying: frequency of completion of research assignments in geography study; degree of interest in using technological and engineering approaches; preferences regarding format of educational projects; assessment of didactic effectiveness of STEM-methods for understanding and retention of material; perception of the developmental potential of research assignments in forming cross-disciplinary competencies.

Data Collection Instrument. The questionnaire items were formulated taking into account the age-related characteristics of respondents, employing simple and clear terminology, with response options provided

to enable students to adequately express their position. The completion time for the questionnaire was 10–15 minutes, which ensured minimization of fatigue and enhancement of answer quality.

Ethical Consideration. The conduct of the research was carried out in accordance with principles of bioethics and generally accepted standards of research activity. Before the survey, informed consent was obtained from students and their parents (legal guardians) regarding participation in the research, with detailed familiarization with the objectives, tasks, and data collection procedures. Complete confidentiality and anonymity of responses were guaranteed, with exclusion of any possibility of respondent identification. Data obtained in the course of the survey is used exclusively for scientific purposes and is not subject to transmission to third parties without the consent of participants.

Results and Discussion. Based on the survey conducted with 27 seventh-grade students within the framework of the research topic "Development of research skills among students through STEM-education in geography instruction", quantitative results were obtained (Figures 1–5), permitting identification of peculiarities in the integration of technological and engineering approaches into the educational process of geography at the level of basic general education.

Figure 1

Results of students' responses to the question "How often do you complete assignments in geography lessons that require not simply memorizing facts, but conducting a small-scale investigation (for example, analyzing data, formulating your own hypothesis, conducting an experiment, or creating a project)?"

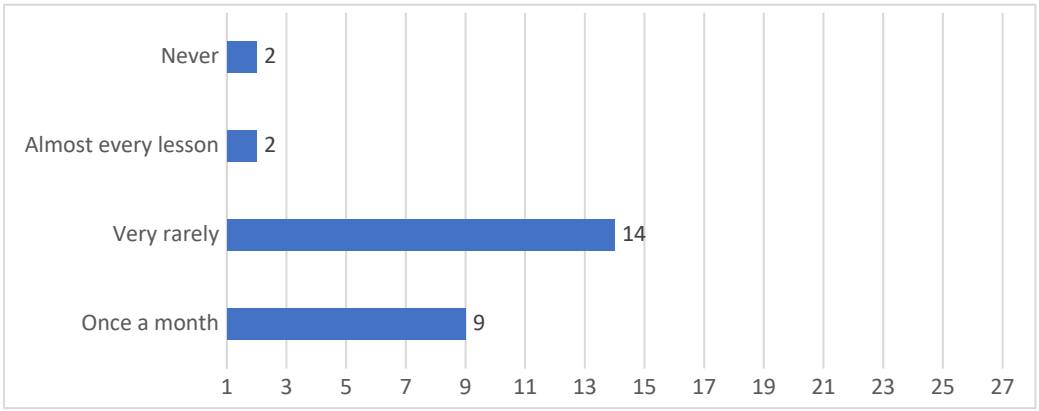


Figure 2

Results of students' responses to the question "Evaluate how interesting it is for you to complete assignments in geography lessons where you use technologies (for example, digital maps, satellite imagery, measurement sensors) or engineering approaches (for example, you create a model, design a solution to an environmental problem)?"

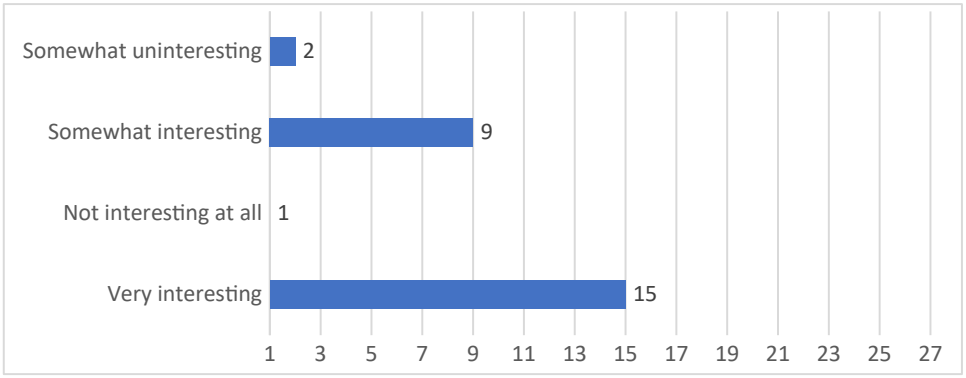


Figure 3

Results of students' responses to the question "If you were offered to choose a topic for an educational geography project to make it more interesting for you?"

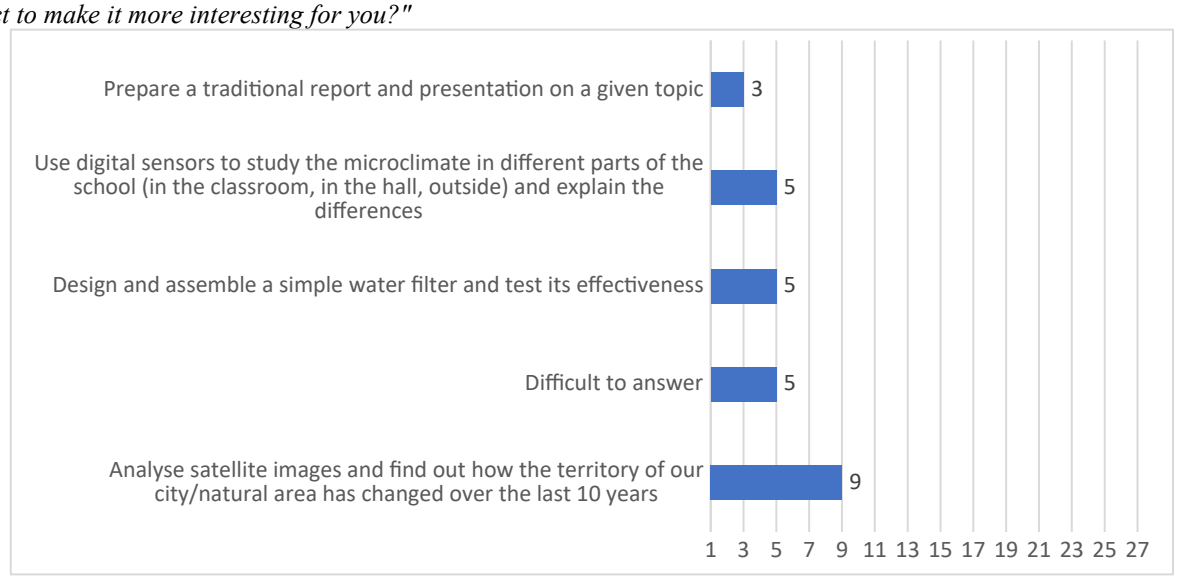


Figure 4

Results of students' responses to the question "In your opinion, do assignments where you need to work with data, technologies, and create something new help you better understand geography material?"

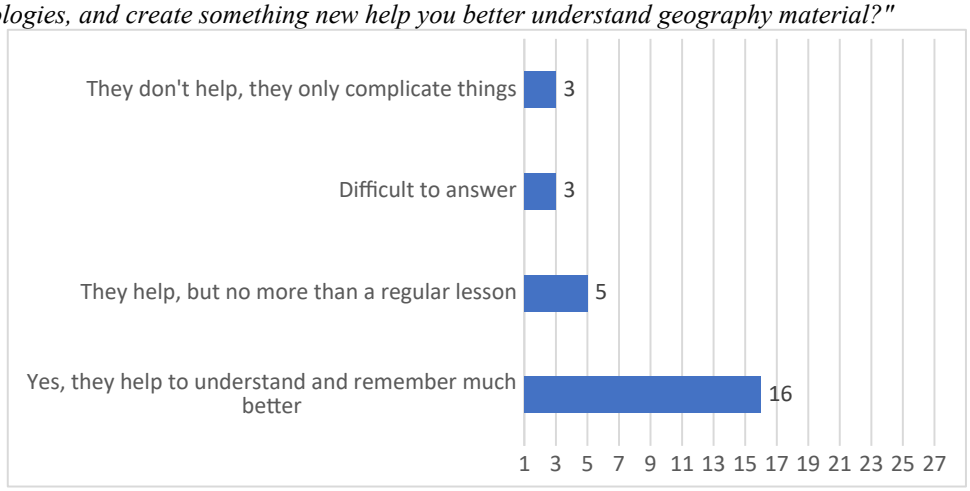
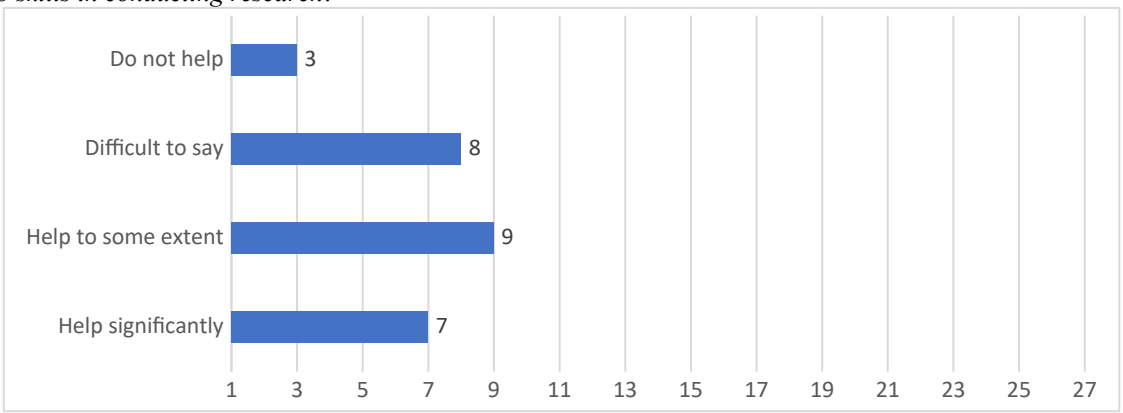


Figure 5

Results of students' responses to the question "Evaluate how many assignments you need to use knowledge from different subjects (for example, physics, technology, mathematics) to solve a practical task in geography help you develop skills in conducting research?"



Analysis of the frequency of research assignment completion revealed an absence of systematic application in educational practice. Only 2 respondents (7.4%) indicated

regular completion of such activities in nearly every lesson. The majority of responses consisted of indicators of rare utilization of research assignments: 11 students (40.7%) reported frequency of completion once per month, while 12 students (44.4%) characterized such activity as occurring extremely rarely. Two students (7.4%) reported having no experience with research assignments, attesting to the existence of a category of students entirely excluded from this educational practice, indicating the necessity to increase the frequency and regularity of application of research methodologies in the process of geography instruction.

Nevertheless, high substantive recognition of the value of STEM approaches in geography education was identified. The overwhelming majority of respondents, 18 individuals (66.7%), evaluated the inclusion of technologies and engineering approaches in geography study as "very interesting." Additionally, 7 students (25.9%) selected the position "rather interesting." Thus, the aggregate indicator of positive attitude toward integration of STEM components into geography education comprises 25 respondents (92.6%). Negative assessments ("rather uninteresting" and "not interesting at all") were expressed exclusively by two students (7.4%), confirming the priority of this approach in motivational terms.

Analysis of student preferences regarding the thematic content of educational projects revealed an uneven distribution of interests. The most attractive direction proved to be the analysis of satellite imagery for investigating territorial changes, which 11 individuals (40.7%) selected. Projects related to the design of water filtration systems and investigation of microclimate employing sensors interested respectively 5 (18.5%) and 6 (22.2%) students. Simultaneously, 5 respondents (18.5%) demonstrated adherence to traditional forms of knowledge presentation, selecting reports and presentations, reflecting the persistence of conservative educational preferences regarding result presentation methodology.

Assessment of the didactic effectiveness of research assignments relative to achieving understanding and retention of academic material proved positive. The majority of respondents - 17 students (63.0%) - are convinced that such assignments contribute to understanding and assimilation of material "significantly better" than traditional teaching methods. Five students (18.5%) acknowledged their usefulness, but not exceeding the effectiveness of conventional lessons. Three respondents (11.1%) found it difficult to provide a definite assessment, while two students (7.4%) indicated that research assignments "do not help, but only complicate" the educational process.

Regarding the cross-disciplinary aspect of research competency development, recognition of the developmental potential of STEM integration was identified. Eleven students (40.7%) indicated that such assignments "significantly" contribute to the development of research skills, while 9 individuals (33.3%) evaluated their influence as positive but partial. Thus, the aggregate indicator of positive perception of the developmental effect comprises 74% of respondents. Simultaneously, 4 respondents (14.8%) experienced difficulty in assessing the influence of STEM methods on the development of research competencies, and 3 students (11.1%) did not perceive a significant contribution to the formation of corresponding skills.

The quantitative analysis data provide grounds to establish that STEM approaches demonstrate pronounced potential in developing the research abilities of students in geography instruction. The obtained results are substantiated by positive assessments of students themselves regarding the motivational value, didactic effectiveness, and developmental influence of integration of technological and engineering approaches into geography education. Nevertheless, a key problem remains the unsystematic character of the application of research methodologies, which substantially constrains the possibilities of comprehensive and consistent

formation of research competencies among students and requires purposeful correction of educational practice.

Conclusion. The conducted research demonstrates that integration of STEM methodology into geography instruction at the level of basic general education possesses pronounced developmental potential. Analysis of the obtained data revealed a substantial discrepancy between the proclaimed educational potential of research methodologies and their actual implementation in school practice. Despite the fact that the current application of research assignments is characterized as unsystematic (more than 45% of students rarely or extremely rarely complete such assignments), students demonstrate a high level of motivational readiness for their implementation. Empirical data indicate that STEM approaches in geography education facilitate the transformation of passive knowledge acquisition into active research activity, ensuring the development of all structural components of research skills: from the generation of hypotheses and design of investigations to accumulation, analysis, and interpretation of empirical data. The value of STEM integration lies in ensuring didactic effectiveness through the synthesis of natural scientific knowledge, technological instrumentation, and mathematical apparatus in addressing practice-oriented geographical tasks possessing social and ecological significance.

Nevertheless, the research identifies a key problem requiring correction: low systematicity of application of research methodologies substantially constrains the possibilities of comprehensive formation of research competencies, indicating the necessity for purposeful changes in educational policy and methodological preparation of educators. It is recommended to increase the frequency and regularity of implementation of STEM practices in the process of geography instruction, ensuring a consistent and comprehensive character of their realization. Further research should be oriented toward the development of detailed methodological recommendations for structuring STEM-oriented geography curricula, the determination of criteria for assessing the formation of research competencies, and the identification of conditions optimizing the transfer of developed skills to addressing authentic geographical problems.

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An Integrative Model for Assessing Students' Personal Development: Recommendations

Abstract

Introduction. In the context of global educational trends and updating the content of secondary education in the Republic of Kazakhstan, the problem of developing a scientifically based system for assessing students' personal results is particularly relevant. The study aims to theoretically substantiate and design an integrative model for assessing the personal development of schoolchildren, adapted to the socio-cultural and regulatory context of Kazakhstan. The article presents an analysis of modern international and domestic approaches to the assessment of meta-subject and personal results, including 21st-century competencies, socio-emotional skills, value orientations. *Results.* The critical and analytical work allowed us to identify some scientific and methodological imperfections of pedagogical practices, such as the dominance of summary assessment and the lack of consistency in the implementation of reforms. *Scientific novelty*. The authors propose a multicomponent integrative model combining criterion-oriented, dynamic, qualitative-quantitative, and reflexive-developmental approaches. An adapted portfolio of personal achievements, scales of situational assessment, reflective journals, and the method of longitudinal observation are recommended as key tools. *Practical significance.* Special attention is paid to methodological recommendations for the implementation of the model at the institutional level: phasing, training of teaching staff, development of a local regulatory framework, and minimizing the risks of formalization. The logical result is a practical recommendation in the form of a developed model that contributes to improving the assessment policy in school education in a personality-oriented approach.

Keywords: integrative assessment model, personal development, implementation effectiveness, managerial decisions, pedagogical decisions, 21st century competencies, criterion assessment.

Introduction. In the modern educational paradigm of Kazakhstan, focused on the implementation of sustainable development goals and the formation of a competitive personality, there is a natural shift from purely academic results to the assessment of a student's comprehensive personal development. This is due to the global transformation of education, driven by the challenges of the Fourth Industrial Revolution, which has ushered in a transition from the paradigm of "knowledge" to that of "competencies" and "personal potential" (WEF, 2020). By consistently modernizing its educational system, our country has consolidated the state-mandatory standard of secondary education of the Republic of Kazakhstan (2018), the requirements for students' personal results, including the formation of value orientations, civic identity, functional literacy, and soft skills.

The resolution adopted by the General Assembly (2025), "Transforming our world: the 2030 Agenda for Sustainable

Development" states in paragraph 25, "We will strive to create an environment conducive to the full realization of their rights and opportunities for children and youth, which will help our countries benefit from the demographic dividend, including thanks to a safe school environment and the cohesion of communities and families".

Government programs in the field of education focus on the upbringing of a citizen, a patriot, a socially responsible, and harmoniously developed personality. However, the implementation of appropriate measures at the institutional level faces a significant methodological deficit in assessing their results. Nevertheless, there is a significant gap between the declaration of the importance of personal development and the actual practice of evaluating it in schools. Thus, a fragmented, often formal approach prevails, which boils down to taking into account participation in events or the subjective characteristics of the teacher or class teacher.

The lack of unified, scientifically verified approaches to measuring personal growth leads to the formalization of educational work, subjective judgments, and the inability to adjust pedagogical strategies based on reliable data. Thus, there is an urgent need to develop an integrative assessment model that would overcome these contradictions. The purpose of this article is to present the conceptual framework and methodological recommendations for such a model, synthesizing the best international practices, taking into account national specifics.

The need to develop the concept of an integrative model that allows collecting data, analyzing it, and making managerial decisions based on it at the school level is obvious, since it is conditioned by modern requirements for the quality of education, in addition to academic achievements. The development of social and personal competencies of students is also necessary. It is well known that the meeting of the UNESCO High-level Steering Committee on SDG 4 (2025) in Santiago, Chile, confirmed the central role of teachers and the teaching profession in leading the efforts of the global educational community to achieve SDG 4 and transform education.

There is a contradiction between the lack of uniform methodological approaches to the implementation of a comprehensive model for assessing personal development and the methods of using data for managerial and pedagogical decisions in the secondary education system. In this regard, our goal was to determine the methodological features of the implementation of the developed models for evaluating the results of personal development and the effectiveness of implementing appropriate measures at the educational organization level, models for making managerial and pedagogical decisions based on the data obtained for teachers and heads of secondary schools, and to develop assessment tools and a decision-making algorithm, identify the stages of the process, and develop recommendations for teachers and supervisors. Since the object of the study is an educational organization (secondary school), the subject is the participants in this process: teachers, managers, and administrative staff.

Modern education, proclaimed in key international documents, the draft political declaration REV 1, by the United Nations (2025) as a fundamental human right and a cornerstone of social development, a strategic investment in poverty eradication and social integration, places new demands on its results. The education system is expected to form not only knowledge, but also a holistic, adaptive, socially responsible personality capable of productive activity in a complex world. This global request directly actualizes the problem of evaluating personal and metasubject results, which is widely studied in international practice.

In the Kazakh context, responding to these challenges, scientists laid the foundations for updating the educational process, and researchers like Zhumabayeva et al., (2021) developed concepts of meta-subject education aimed at a holistic perception of the world. However, a paradox

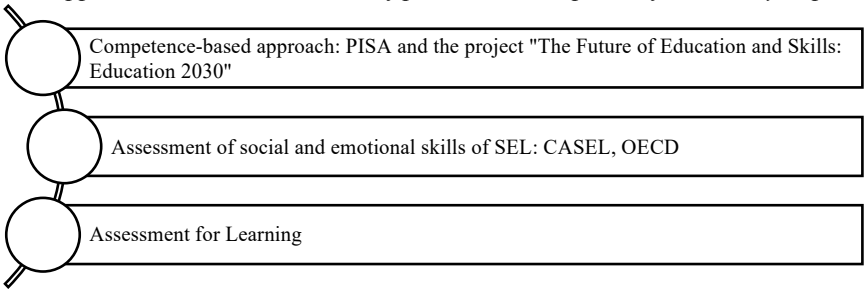
arises: when declaring a lofty goal, the upbringing of a personality as the basis of social development, there is no adequate toolkit at the level of a specific educational organization to measure progress in achieving it. Most of the research is still focused on didactics and knowledge assessment, leaving the methodology of systematic assessment of personal development and educational effect poorly understood. Thus, there is a critical gap between the scale of the proclaimed mission of education and the operational ability of the school to evaluate this mission and, consequently, to purposefully implement it. As you know, personal development and psychological well-being of students play a critically important role in modern education. According to foreign scientists Eccles & Roeser (2011), school, being one of the main institutions of socialization, has a significant impact on the formation of a child's personality and their psychological state.

Durlak et al., (2011) believe that personal development includes the formation of self-awareness, the development of emotional intelligence, interpersonal communication skills, and the ability to self-regulate. As we previously pointed out, the school provides a unique opportunity for the purposeful development of these qualities through specialized programs of socio-emotional learning (SEL); integration of developmental elements into the curriculum; extracurricular activities aimed at developing leadership skills and creative abilities, and more.

World pedagogical science has accumulated considerable experience in conceptualizing and evaluating non-academic results (Figure 1), which confirms the relevance of the problem for the educational community.

Figure 1

International approaches to the assessment of personal development: from theory to practice



As is known, the PISA program carries out targeted reform work in the field of assessment and improvement of personal development in the OECD with its project "The Future of Education and Professional Skills: Education 2030". This document laid the fundamental foundation for clarifying key competencies of students, such as the formation of new values, the resolution of dilemmas and problematic situations, and social responsibility (Howells, 2018). In this aspect, the assessment shifts from "knowing what" to "knowing how" in the context of complex, ambiguous situations.

The Assessment of Socio-Emotional Skills (SEL), CASEL studies, and major international studies such as SSES (Social and Emotional Skills Research) and the OECD show a direct relationship between personal self-awareness, self-management, social sensitivity, relationship skills, and responsible decision-making with academic achievement and well-being in life (OECD, 2021).

Assessment for Learning is a concept developed by William (2011), which focuses on formative assessment as a process embedded in learning activities and aimed at receiving feedback for correcting learning and developing the student themselves. The key methods are qualitative feedback, self-assessment, mutual assessment, and clear criteria for success.

In the domestic context, it should be noted that in Kazakh pedagogical science, the

problem of assessing the upbringing and development of personality has its own history. Thus, the Soviet legacy was characterized by a rigid ideologization of criteria and a collectivist, normative assessment of personality. The period of independence was marked by the search for a national model. It is important to include a national cultural component in education, but the issues of its systematic assessment remain unexplored. According to Karaev (2018), pedagogical technology should ensure that all students receive knowledge and skills not lower than the requirements of the State Educational Standard and, in addition, promote the development of their life skills, subject and key competencies, functional literacy, creativity (creative abilities), including the personal development of schoolchildren. In the context of ongoing transformational processes in the education system, such as decentralization, democratization, and humanization, a modern school should be open and self-organizing. Because within the walls of such a school, there is self-determination and self-development of students, as well as teachers, in harmonious interaction with the local community and the environment (OECD, 2021).

The current stage (within the framework of updating the State Educational Standard) is reflected in the works of specialists of the National Academy of Education named after I. Altynsarin, where the first attempts are made to describe indicators of personal results (Karaev, 2018).

The leading countries of the world are actively developing learning models focused on the personal growth of students. Unique models of the formation of the educational environment have been developed, aimed at supporting the individual abilities of students. Finland, Canada, the USA, and Australia have succeeded in this direction, adapting their educational systems to the requirements of the time (Table 1) (Methodological recommendations on creating an educational environment for the development of personal potential of primary school students, 2025).

Table 1

The key principles of the educational environment organization, as well as the methods that ensure its effectiveness

Countries	*Key principles and techniques*
Finland	Individual approach and learning flexibility
	Practice-oriented and project-based learning
	A comfortable psychological atmosphere
	The role of the teacher in the Finnish School
	of Technology and digitalization in education
Canada	Individualized learning, focused on the needs and interests of students
	Inclusivity and accessibility of education
	Development of social interaction through collective learning
	Integration of technology and digital literacy
	Emotional support and personality development
	Parental and community engagement
United States of	Individualization and differentiation of the educational process
America	Inclusive education as a basis for equality.
	Project-based learning and practical skills development
	Formation of social responsibility and civic position
	Psychological support and mentoring
	School-society interaction
Australia	Individualized Learning
	Social and emotional learning
	Innovative technologies
	Inclusivity
	Community engagement and parental involvement
Singapore	Socio emotional learning as a school-wide approach
	Elementary school practices
	of "Values in Action" and civic identity

	Assessment without excessive stress
	Unity of values and school autonomy
Republic of Korea	Social and Emotional Learning (SEL)
	Inclusive and multilingual multicultural school
	Collaborative learning and classroom atmosphere
	Extending study time as a development resource
Japan	Health-saving environment and physical activity
	Special Tokkatsu events are the basis of the educational environment
	Education of values and morals of "Dotoku."
	School lunch as an educational practice (health-saving environment)
	The professional culture of the school
Russian Federation	The program "School of Personal Potential Development" (SRLP)
	The experience of the General Education Center of the Skolkovo Innovation Center
	The Teacher Program
	Pilot models of the Institute of Educational Development Strategy of the Russian Academy of Education
	The Future Skills program from WorldSkills Russia
Kazakhstan	Physical educational environment
	Psychological safety
	Social interactions
	Organization of the educational process
	Values and meaning
	Inclusivity and accessibility
	The digital environment

The analysis showed that in the education systems of many countries, there is a tendency to transform education according to globalization and digitalization, for example, it focuses on integration, civic identity, subjective well-being, professionalism, and autonomy of educational organizations. Thus, we are witnessing a conscious paradigm shift towards recognizing the student as a full participant in the educational process.

In countries with a high human capital development index, there is a shift away from rigid assessment systems in favor of formative ones based on qualitative characteristics of academic achievements and constant feedback.

We have already achieved achievements in this work, following best practices, and also continue to improve our education system, creating conditions for the successful development of the younger generation in a dynamically changing world. For example, the National Academy of Education named after Ibray Altynsarin of the Ministry of Education of the Republic of Kazakhstan has been developed and proposed. The developed model of the educational environment for the development of the personal potential of younger schoolchildren includes several structural components: a spatial and subject environment containing a spatial and subject component, a social environment (a component of psychological security, a value-moral component and a component of social interaction), an organizational and technological environment (a component of the organization of the educational process, a digital component).

However, the effectiveness of this model directly depends on how well teachers understand and implement the pedagogical technologies embedded in it. In this context, the results of foreign studies are of particular importance, according to which an inaccurate assessment by teachers of the degree of use of active teaching methods can lead to a decrease in their actual educational level (Testa et al., 2025). If there is a discrepancy between pedagogical perception and actual practice, students do not fully utilize the potential for increased engagement and academic achievement provided by active learning methods. Thus, the discrepancy between the declared and actually applied educational technologies may indirectly affect the quality of education and the level of assimilation of

knowledge by students of different classes.

Since one of the key factors of personal development and psychological well-being of schoolchildren is the educational environment, which has a strong impact on various aspects of their lives, then, of course, close attention should be paid to all components of the educational process (Reinke et al., 2025).

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Materials and Methods. The research is based on the analysis of regulatory documents (SES, state programs), the methodology of systematic and comparative analysis, as well as the synthesis of the best pedagogical practices. Theoretical modeling methods were used to design the evaluation system.

The methodology of this research is based on a system-oriented approach, the concept of "psychological and pedagogical quality control" as an integrative system.

Stages of development. The concepts of the conceptual model: the purpose of personality development, related indicators, and the relationship between learning processes and personal growth.

Development of a set of indicators: cognitive, socio-emotional, motivational, value-based; indicators of behavior in educational activities and extracurricular activities.

Data Collection Tools. self-assessment criteria, observed indicators, portfolios, competency tests, questionnaires for teachers and parents, and academic results data for contextualization.

Data Analysis Methods. unified processing and measurement procedures, quality indicators, risk indicators, and visualization methods.

Decision-making model: data-based algorithm based on ethical and equal opportunities; feedback procedures and adjustments to measures

According to Zhumabayeva et al., (2021), the very aspect of the quality and effectiveness of the pedagogical system is important, while a special place is given to the pedagogical conditions that ensure the effectiveness of the pedagogical system. In particular, pedagogical conditions are the environment, the conditions in which the pedagogical process takes place.

Consequently, the meta-objective approach is focused on the formation of universal ways of cognition and action that are transferred to real-life situations and contribute to the development of a new type of thinking. However, the effective use of these methods and the very quality of educational activity are largely determined by the psychological climate in which it takes place. This is directly related to Goal 4 of the UN SDGs, which proclaims the need to create a safe, inclusive, and effective learning environment. The UNESCO global project "Happy Schools" and the monitoring data of the Unified Education Program in Kazakhstan emphasize that a favorable educational environment and the purposeful development of socio-emotional skills are not just an addition to the educational process, but its fundamental condition. Socio-emotional skills (self-regulation, empathy, cooperation) act as meta-competencies that provide the very possibility of effective learning, reflection, and collaboration inherent in the meta-subject approach.

They create a "breeding ground" for the use of metasubject methods of action in solving complex life tasks, where stress tolerance and communication skills are critically important, as well as the personal development of a modern student.

Consequently, the meta-subject approach and the development of socio-emotional skills represent two complementary systems of modern education: the first provides tools for cognition and action, the second provides psychological and social readiness to master and effectively

apply these tools for personal and social well-being.

A modern school is not only a place of learning basic knowledge, but also a key environment for the formation of a child's personality. Modern educators face a difficult task: how to ensure the well-being of every student, despite the demographic growth of school-age children, the diversity of their characteristics and needs in such a digital age. The main goal is to develop scientific and methodological support for primary schools in creating an educational environment where every child receives opportunities and conditions for holistic development (intellectual, emotional, social, and value-based). Personal potential is understood as a set of individual characteristics and capabilities of a child that helps him achieve success in life; at the same time, the emphasis is placed on the combination of "environment, child's experience, and adult support", which ensures the disclosure of this potential. Diagnostic tools and a set of management solutions that are directly applicable in school practice are offered to assess and improve the school environment.

Two factors, in particular, help students to show independence. The first is a personalized learning environment that supports and motivates each student to develop their hobbies, make connections between different types of learning experiences and opportunities, and develop their own learning projects and processes in collaboration with others. The second is to create a solid foundation: literacy and numeracy are still crucial.

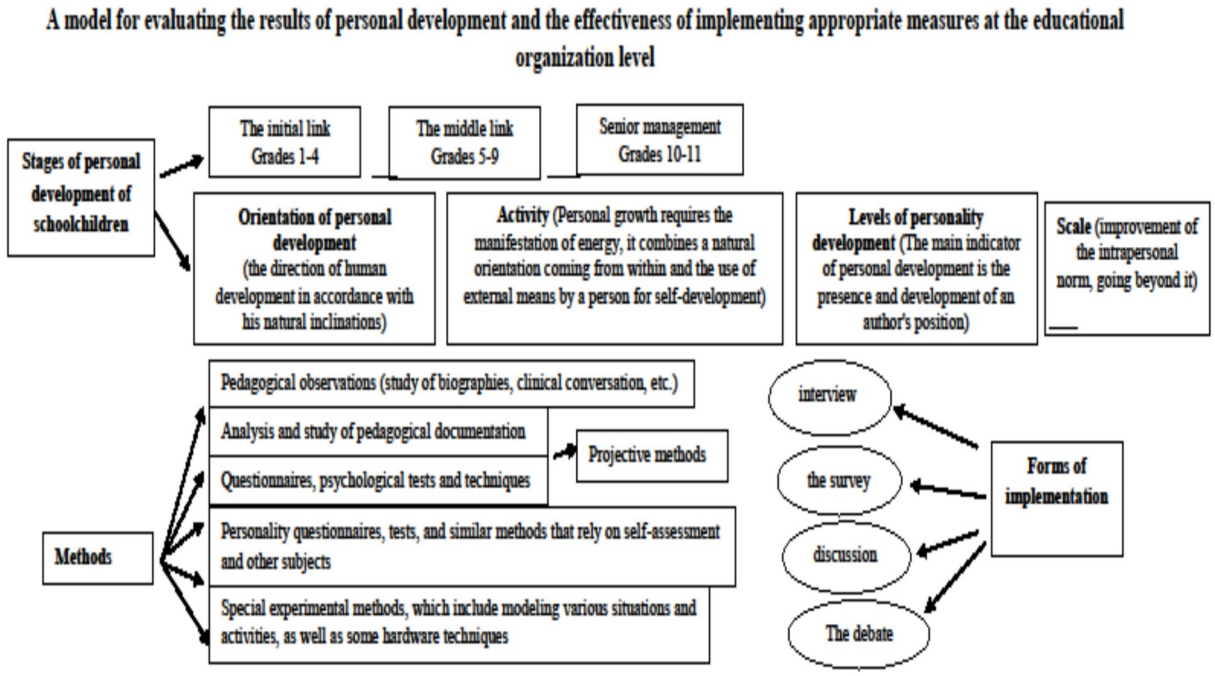
Results and Discussion. It is well known that the integration of science and practice is the basis for improving education. Thus, according to the Russian scientists, Columbayeva a00nd Aitpayeva (2020), the integration of science and practice is a necessary condition for further improvement of educational activities. This process occurs when previously disconnected elements exist, and there is an objective need to combine them. As a result of the synthesis, a new, more holistic and functional system is formed (Columbayeva and Aitpayeva 2020).

Consequently, the practical implementation of the integration principle is the model we have developed for evaluating the results of personal development and the effectiveness of implementing appropriate measures at the educational organization level (Figure 2).

At the same time, the question arises: In what modes does the student's personal development take place? In the modes:

1. The inclusion of reflexive consciousness, which is a guideline for the correct perception of objective reality, thereby forming a real model;
2. Comprehension of options and alternatives, leading to a reflexive awareness of all existing options and alternatives in any choice;
3. Living in a paradoxical state, a kind of splitting of oneself into "I am the present" and "I am the future" - there is a choice of the personality that I create and choose to be for myself;
4. Identification of unobvious but productive alternatives for the best implementation of their plans in life and professional activity;
5. Awareness of the price of choice, that is, acceptance of the price that must be paid for each of the possible options; in other words, it is an existential calculation.
6. Awareness of responsibility for choosing the choice of the chosen alternative that a person can carry according to the use of two strategies for determining their own identity;
7. Freedom, autonomy, and self-expansion, which are understood as personal development, gaining independence, a greater degree of inner freedom, and personal identity.

Figure 2
A model for evaluating the results of personal development and the effectiveness of implementing appropriate measures at the educational organization level



Evaluation parameters	Parameters of the Riff scale + Well-being Index	1-11	Questionnaire "Scale of psychological well-being" by K. Riff (adaptation by T.D. Shevelenkova, P.P. Fesenko)
	Diagnosis of personal growth	5-8, 9-11	Test "Diagnostics of personal growth of schoolchildren" (I.V.Kuleshova, P.V.Stepanov, D.V.Grigoriev, 2006)
	Diagnosis of learning motivation	1-4	Typology of the motives of the teaching "The Ladder of motives" (A.I. Bozhovich, I.K., Markova)
			Methodology for the diagnosis of educational motivation of schoolchildren (methodology of M. V. Matyukhina, modified by N.C. Badmaeva)
		5-9, 10-11	Methodology for the diagnosis of learning motivation and emotional attitude to learning in middle and high school (based on the questionnaire by C. D. Spielberger, modified by A.D. Andreeva)
			Academic motivation scale (by T.O. Gordeeva, O.A. Sychev and E.N. Osin based on the Vallerand Academic Motivation Scale; the theoretical basis of the methodology is the theory of self-determination by E. Disi and R. Ryan)
	Diagnosis of communication skills	5-9 (it is also possible for 10-11)	Questionnaire "Communicative and organizational inclinations" V.V. Sinyavsky, V.A. Fedoroshin
			Mikhelson's Communication Skills Test
			The test of "Communicative and organizational inclinations"
			Tvorogov's "Communication Technique" scale
	Emotional intelligence	1-4	1. The projective technique of "Redrawing: the world of things — the world of people — the world of emotions"
		10-11 (for adults)	2. The projective technique of "Three Desires" (M.A. Nguyen)
			Hall's emotional intelligence test
	Critical thinking		SREIT Test (Schutte Emotional Intelligence Test)
			The "Six Hats of Thinking" method by Edward de Bono
			The method of "Socratic questioning" or "socratic dialogue"
	Analysis of academic performance		"SWOT analysis"

As a result of the implementation of the model developed by the researchers for assessing the results of students' personal development, an upgrade training course, "Inclusive Education: modern practices for teachers," is being conducted at the E.A. Buketov Karaganda University.

A striking example of integration was the upgrade training course "Inclusive Education: modern practices for teachers", conducted based on the E.A. Buketov Karaganda University (Karaganda, Kazakhstan) from 05/19/2025 to 05/31/2025 for graduates of pedagogical specialties. This course was organized as part of the implementation of a model for evaluating the results of students' personal development and

the effectiveness of implemented measures at the level of educational organizations.

The relevance of the course was determined, on the one hand, by the scientific and theoretical requirements of state standards and data from modern pedagogical research, and, on the other, by the practical social demand for creating an accessible educational environment for people with special educational needs. Thus, the course served as a platform for synthesizing current scientific knowledge and the direct demands of educational practice.

The purpose of these advanced training courses is the formation of basic professional competencies in the field of inclusive education among young teachers of subject specialties in accordance with the professional standard "Teacher", approved by the order of the Acting Minister of Education of the Republic of Kazakhstan dated 12/15/2022 №500.

The following tasks were performed:

1. To familiarize students with modern approaches and the regulatory framework of inclusive education;

2. To form a willingness to design and implement inclusive educational practices within their subject area;

3. To teach methods of adapting the learning content to the individual needs of students;

4. Develop interaction skills in an inclusive team: teacher-psychologist-defectologist-parent-student.

As expected results at the end of the course, students should:

– Understand the legal, pedagogical, and ethical foundations of inclusion;

– Possess basic approaches to teaching children with special educational needs;

– Adapt the lesson according to your subject area, taking into account the needs of students;

– Be ready to collaborate with colleagues and parents in an inclusive environment.

– Implement universal design elements in your practice.

At the end of the course, a gamification technique was used to collect feedback from the audience – the creation of a "Conceptual Cloud". Based on the thematically received materials, the students gave their definition of inclusive education in one word, thereby creating on the platform https://wordart.com/edit / your own conceptual cloud.

The main conclusions of such integration are:

"Theory put into practice," that is, the course is a direct practical implementation of the theoretical position on integration. He combined previously disconnected elements: current scientific research in the field of inclusion (as part of the "science") and the urgent need of schools for qualified personnel (as part of the "practice");

– "Formation of a new integrity", because as a result of this synthesis, a new functional system is being created, a community of teachers whose professional training is based on modern scientific approaches and is ready to solve practical problems of inclusive education. This increases the integrity and effectiveness of the educational system in the region.

– "Responding to systemic challenges", as this event demonstrates how the integration of science and practice directly responds to the key challenges of modernizing Kazakhstan's education: ensuring social integration and equal access to quality education for all children;

– "A model for further development", because such courses, based on the principles of integration, can serve as an effective model for the continuous improvement of pedagogical practice through its constant connection with the development of scientific knowledge and changing social conditions.

The development and testing of teacher training content in the field of special education proves the leading idea of this work, which is the unity of scientific knowledge on well-being and the practical needs of participants in the educational process in optimizing the mechanisms for evaluating educational outcomes.

One of the key indicators of the originality and innovation of this course, as well as its creative approach to learning, is that it has been officially registered as an intellectual property object. The intellectual authorship of the developed Upgrade course "Inclusiviti bilim beru: educatorge arnalgan zamanawi tajiribeler" / "Inclusive education: modern practices for teachers" is confirmed by the certificate of entry of information into the state register of copyrighted objects No. 60636 dated July 8, 2025, issued to the developers Kudarinova et al., (2025).

As practical recommendations for teachers, we can specify: how to integrate personal development indicators in lessons and extracurricular activities; how to use assessment data to plan individual and group educational trajectories; how to conduct reflection with students and parents.

Practical recommendations for managers:

- How to organize a data collection and storage system, ensuring confidentiality;
- How to form management decisions based on data: resource planning, e-planning adjustments, support program management;
- How to build a professional development system for staff working with the model.

Specific KPIs and performance thresholds:

- accelerating progress on personal development indicators;
- the relationship between implemented measures and changes in educational motivation;
- influence on discipline and informativeness.

If we talk about the advantages of the developed model, then we should mention consistency, transparency, the ability to adapt to a specific school, and consideration of ethical aspects.

The following algorithm of actions is proposed for successful testing of the model at the educational organization level:

1. Preparatory stage:

– creation of a working group (administration, psychologist, methodologists, active teachers);

– adaptation of the proposed criterion-indicator grid to the specific mission and values of the school;

– development and approval of a local regulation on the assessment of personal results, which establishes goals, tools, frequency, ethical standards (confidentiality, right to error, and growth);

– choosing or developing a digital portfolio management platform.

2. Personnel training stage:

– conducting training seminars on the topics "Critical assessment of personal qualities", "Techniques of pedagogical observation and fixation", "Inclusive education: modern practices for teachers", "Conducting, developing feedback and reflective conversations", "Working with a digital portfolio", etc.;

– organization of pilot projects in separate parallel to work out procedures.

3. Implementation and monitoring stage:

– launching the model with mandatory informing of parents and students about its goals and procedures;

– the introduction of regular "Reflection and Goal-setting Days", where the student formulates personal growth goals for the next period based on the portfolio data and feedback from the teacher;

– the aggregation of anonymized data at the school level to analyze the effectiveness of educational programs and make managerial decisions, rather than to compile ratings of children.

4. Risk management:

– The risk of formalization: To counteract it by focusing on the quality of reflection rather than the quantity of artifacts collected;

– Risk of subjectivity: Minimize through the use of clear descriptors, cross-assessment (multiple educators), and observational skills training;

– Risk of overload: Digitalization, surveillance map templates, integration into regular lessons.

Thus, a key condition for the development of personal potential of schoolchildren is an integrated educational environment; the autonomy of educational organizations as a sustainably implemented practice; a conscious paradigm shift towards recognizing the student as a full participant in the educational process; priority and appreciation of the professional role of teachers; emphasis on civic awareness; orientation of education systems towards the harmonious development of personality and the well-being of citizens.

Conclusion. A comprehensive methodological framework for a model for evaluating the results of personal development and the effectiveness of measures at the educational organization level is aimed at improving the objectivity of management actions, transparency in measuring the results of implemented measures, and the sustainable development of students in secondary schools. Thus, the proposed model provides a link between learning processes, personal development in education, and educational activities, as well as ensuring the sustainability and scalability of all education. Therefore, it is recommended to carry out continuous implementations with mandatory professional training of personnel and monitoring of data quality. Thus, the introduction of a model for assessing personal development and the effectiveness of educational work in Kazakhstani schools is a difficult but necessary methodological task. Its success depends on overcoming reductionism, i.e., reducing the student's personality to simple indicators, measurable and formal. In our opinion, it is necessary to clearly understand the goals and objectives of assessing students' personal development, to choose the right tools for their control, which, in principle, is an important factor in the effective implementation of all proposed models and innovations in managerial decision-making. Thanks to the consolidated work of scientists who have developed these models for assessing the results of personal development and the effectiveness of implementing appropriate measures at the level of the educational organization, the Ministry of Education, creating framework methodological recommendations, and the schools themselves, testing and adapting the models to their own context. Only the creation of such a methodological ecosystem will make the process of education at school more conscious, purposeful, evidence-based, and effective.

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Modernizing Higher Education Programs with Crowdsourcing

Abstract

Introduction. The modernization of educational programs in the context of digital transformation requires the prompt consideration of the opinions of all participants in the educational process. This article examines the potential of crowdsourcing as a tool for the collective design of educational programs, enabling the integration of the expertise of employers, students, and the academic community. *Methodology and Methods*. The theoretical and methodological framework of the study is grounded in the socio-psychological theory of social constructivism (mechanisms of external assimilation and external accommodation). The research employed descriptive statistics, expert evaluation, and structural analysis, as well as methods for assessing resource intensity and resource efficiency. *Results.* The practical implementation of the developed model demonstrated that crowdsourcing serves as an effective mechanism for the inclusive development of higher education. Its adoption ensured synergy between academic rigor and practical expertise, making it possible to modernize the structure of educational programs within a short timeframe, taking into account the perspectives of all stakeholders. *Scientific Novelty*. The adaptation of crowdsourcing technology to the development of higher education programs expands the methodological toolkit for quality management in higher education, with practical *Significance*. The study highlights the potential application of the proposed crowdsourcing models for designing flexible educational pathways. The findings may be used in the development of digital platforms for labor market monitoring and university-industry collaboration, thereby contributing to the formation of relevant professional competencies among graduates.

Keywords: crowdsourcing, higher professional education system, modernization, educational programs, assessment of crowdsourcing effectiveness.

Introduction. In the modern world, the use of digital technologies in professional training has become one of the most important conditions for achieving competitiveness in the educational services market. For educational institutions, the time has come to focus professional training processes on the requirements of interested parties (stakeholders) (Pinchuk et al., 2022). The current reality demonstrates that the main trends in the development of educational technologies may progress in at least three directions:

a) the development of innovative platforms for implementing educational innovations;

b) the integration of project-based approaches and start-ups into the educational environment aimed at forming confident additional skills;

c) investment in the development of one's own intellectual potential at any age (Organization for Economic Cooperation and Development (OECD, 2021).

It may be argued that the emphasis on such modern priorities in professional training makes it possible to speak of a university's competitive advantage. However, an innovative path of development is based not only on the intellectual and creative potential of university staff, but also on the potential of society as a whole (Hadiyanto, 2019). It is widely acknowledged that crowdsourcing serves as a system-forming factor of effective management, one that initiates motivation and the search for innovation (Field et al., 2020; Dolzhenko, 2020).

Recent studies show that the use of crowdsourcing in the educational process, known as a problem-solving approach, possesses didactic advantages that contribute to improving the quality of professional training (Ostrovskiy and Kudina, 2020; Dadzie et al., 2018). Some scholars believe that crowdsourcing will become a new paradigm in the development of education in the near future, provided that it is properly designed and implemented. Therefore, experts and researchers should continue to explore the innovative potential of crowdsourcing in education (Fleaca & Stanciu, 2019). It is considered one of the most accessible and simple ways to bring together instructors, researchers, teachers, professionals, and students willing to share their knowledge and experience (Peng et al., 2017).

Crowdsourcing is defined as the use of the "wisdom of the crowd" to solve existing problems. When effectively managed, it can yield positive results, including the introduction of fresh and innovative ideas (Zdravkova, 2020; Brimzhanova et al., 2022). A review of scientific literature indicates that crowdsourcing in education is mainly used in four cases:

- the creation of educational content;
- the provision of practical experience;
- the facilitation of knowledge exchange;
- the strengthening of feedback mechanisms.

Accordingly, various approaches to educational crowdsourcing exist, including collaborative projects, the creation of open educational resources, peer assessment, and problem-based learning (Rajkumar & Kishore, 2021).

Despite the similarities of crowdsourcing with co-design and collaborative learning, it possesses distinctive features, such as the construction of a clear organizational structure with a managerial function performed by the crowdsourcer, the mandatory use of online platforms, and the detailed specification of the form of the crowdsourcing task solution. Within the educational system, crowdsourcing is applied to obtain shared knowledge, while crowdsourcing mechanisms enhance and support this activity (Zhanguzhinova et al., 2019).

The theoretical basis for constructing a collaborative model of design or learning through crowdsourcing may be social constructivism. Joint discussion of educational tasks refers to the externalization of individual knowledge and experience from the cognitive system to the social system through the processes of external assimilation and accommodation (Cricelli et al., 2022). A collaborative environment implies that interested groups, together with universities, solve problems related to the modernization of educational programs to improve the quality of specialist training (Mombek et al., 2024). Participants contribute to the co-creation of knowledge by offering ideas, expertise, and solutions. These contributions may include both objective and subjective content, which is subsequently aggregated or filtered. Aggregation can be carried out using either comprehensive or selective approaches (Mansi et al., 2023). All information gathered from the crowd must undergo verification (Aguilar et al., 2019).

Furthermore, the success of collaborative crowdsourced educational

projects requires the development of an appropriate structure and organization of cooperation, as well as effective management of crowdsourcing mechanisms. These mechanisms are classified based on their relation to the crowd, to the crowdsourcer, to the specific task, or to the platform. Other management mechanisms identified in the literature include incentive mechanisms, task decomposition and integration mechanisms, and feedback mechanisms.

Engagement mechanisms include providing the crowd with opportunities to participate in problem-solving through open calls disseminated via social media, announcements, invitations, or combinations thereof (Schafhäutle & Veenman, 2024). Emphasis is placed on crowdsourcing governance mechanisms, which may be democratic or hierarchical. Significant attention is also given to motivation and incentive mechanisms that activate crowd participation.

For educational crowdsourcing, the most significant incentives include personal, social, and compensatory factors. Personal incentives stem from the individual (self-esteem, enjoyment, personal interest, self-realization, altruism). Social incentives are associated with societal needs and demands, as well as social status. Compensatory incentives originate from the crowdsourcer and refer to encouragement, facilitation, and empathy (Jame et al., 2016). Empirical studies confirm that taking these mechanisms into account helps satisfy participants' psychological needs, thereby increasing their engagement and activity (Lanschikova et al., 2022).

However, a major challenge for researchers is the measurement of the effectiveness of educational crowdsourcing outcomes. Studies note a lack of conceptual consistency, insufficient comprehensive approaches, methodological diversity, as well as inaccuracy and inadequacy of measurement tools, all of which hinder meaningful comparisons (Lyberatos et al., 2023).

In this context, the present research focuses on developing an educational crowdsourcing model for the modernization of educational programs and assessing its effectiveness. In this regard, crowdsourcing can be seen as an effective, innovative model for organizing digital information-educational interaction in higher education (Wang et al., 2020). Accordingly, the development of educational programs oriented toward the needs of the labor market may be based on the concept of crowdsourcing through the collaboration of the collective intelligence of universities and stakeholders.

Researchers acknowledge that, despite its significant success in business and industry, the impact of crowdsourcing on education remains insufficiently studied. This is primarily due to a shortage of randomized controlled trials evaluating the effectiveness of crowdsourcing models in education, as crowdsourcing in an academic context, as opposed to business and the social sphere, is characterized by fewer participants and non-monetary incentives (Jiang et al., 2018). Moreover, participation in educational crowdsourcing projects is typically limited to students, teachers, and researchers, or certain combinations of these groups. Such projects are often implemented in small groups, since larger groups tend to be either uninterested or unsuitable for solving educational tasks.

Given these observations, and in order to broaden the knowledge base concerning the use of crowdsourcing in education, the purpose of the present study was to measure the effectiveness of crowdsourcing in the modernization of educational programs within professional training areas.

To conduct two online interviews with crowdsourcing participants (before and after the modernization of educational programs) regarding the degree of stakeholder satisfaction with the presented educational programs.

1. Based on best practices, develop a model of the crowdsourcing process for modernizing educational programs in accordance with labor market requirements.

2. To evaluate the effectiveness of crowdsourcing initiatives aimed at modernizing educational programs.

Materials and Methods. This study employed a descriptive quantitative research design incorporating crowdsourcing technologies. The research was conducted at three universities: Abai Kazakh National Pedagogical University, S. Amanzholov East Kazakhstan University, and Azerbaijan State Pedagogical University.

The selection of crowdsourcing as a research method was driven by the need to aggregate the distributed expertise of stakeholders in order to modernize educational programs (EPs) in line with the dynamic demands of the labor market.

The theoretical and methodological framework of the study is grounded in the socio-psychological theory of social constructivism (mechanisms of external assimilation and external accommodation). Within this conceptual framework, a crowdsourcing-based structural and functional model was developed and implemented. In this model, the process of curriculum renewal is viewed as the outcome of collaborative interaction among universities, employers, and students.

Participants. The total sample comprised 745 participants selected through purposive sampling. The sample structure included three key stakeholder groups:

– Applicants (n = 264): potential consumers of educational services.

– Employers (n = 219): experts defining requirements for professional competencies.

– Specialists with higher education (n = 262): practicing professionals assessing the relevance of academic training. (The data are presented in Table 1).

Table1

Demographic and Professional Profile of the Study Participants (N = 745)

Participant Category	Number (n)	Percentage (%)	Key Characteristics
Applicants	264	35,4%	Graduates of schools and colleges (ages 17–19) oriented toward teaching professions.
Employers	219	29,4%	Leaders of educational organizations and representatives of relevant companies (work experience > 5 years).
Professionals (Graduates)	262	35,2%	Working professionals with higher education (work experience 1–10 years).
Total	745	100%	Regions: Kazakhstan (Kazakh National Pedagogical University, East Kazakhstan University), Azerbaijan (Azerbaijan State Pedagogical University).

Data Collection Tools. The primary research instrument was a specially developed crowdsourcing online platform that included multimedia presentations of educational programs (EPs) and a survey system.

– Diagnostic tools: An online survey was administered to assess satisfaction with and the relevance of educational programs. Responses were recorded on a 4-point scale (from 0 – “no” to 3 – “yes”).

– Idea generation: A set of open-ended questions was used to collect proposals for new competencies and courses.

– Validity: The reliability of the instruments was confirmed through expert evaluation and pilot testing with a preliminary group of participants.

*Data Collection Procedure***.** The experimental study was carried out in three consecutive stages:

1. Stage One (Diagnostic): An online survey was conducted to determine the baseline level of satisfaction with educational programs. Participants reviewed video presentations of the programs before completing the questionnaires.

2. Stage Two (Formative): Proposals were collected via the online platform. Participants formulated competency requirements and suggested new courses to be incorporated into the curricula.

3. Stage Three (Analytical): A follow-up survey and online interviews were conducted to evaluate the effectiveness of the implemented model and to compare "before" and "after" indicators following program modernization.

Data Analysis Technique. Data were processed using the SPSS Statistics software package. The methods of analysis included:

– Descriptive statistics: Calculation of means and frequencies to assess participants' subjective perceptions of the educational programs.

– Evaluation of crowdsourcing effectiveness: Calculation of actual outcomes through indicators of resource efficiency and resource intensity:

Resource efficiency:

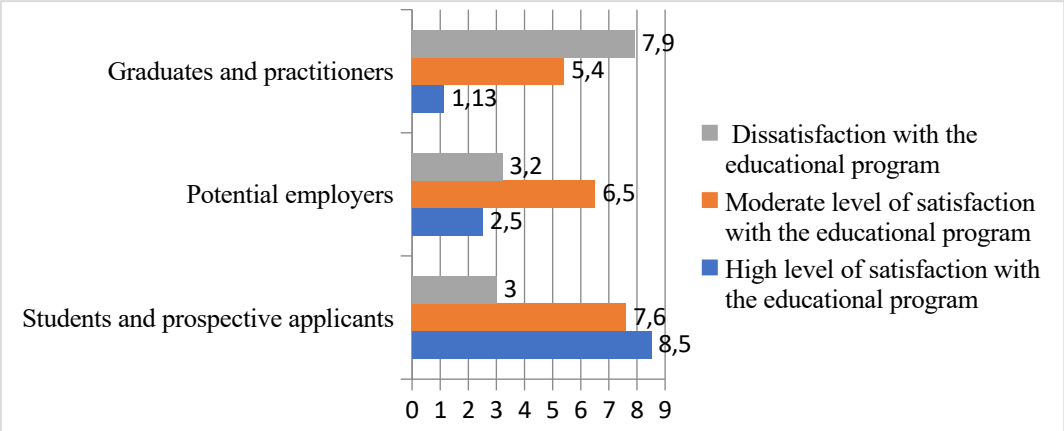
Rr=Outks/Totalks. Where Outks – ideas accepted for the modernization of educational programs (project output ideas); Totalks – ideas proposed during the project (total number of ideas). *Resource intensity* was calculated using the formula: Totalks/Outks.

Qualitative analysis: Content analysis of responses to open-ended questions to identify new professional modules.

Results. Results of the online interviews aimed at determining the level of satisfaction with and demand for the educational programs implemented at the university before the crowdsourcing process (Figure 1).

Figure 1

Results of the online interviews on the level of satisfaction with and demand for the educational programs before the crowdsourcing process



The average results of the online interviews among crowdsourcing participants showed that most students and applicants were satisfied with the quality of the offered educational programs (M = 8.5). According to them, the objectives of the educational programs are clearly formulated and reflect the social demand for specialist training; the graduate model fully corresponds to the criteria of competitiveness in the future professional activity; and the specialist competencies indicated in the programs are aimed at advanced training and have a forward-looking effect.

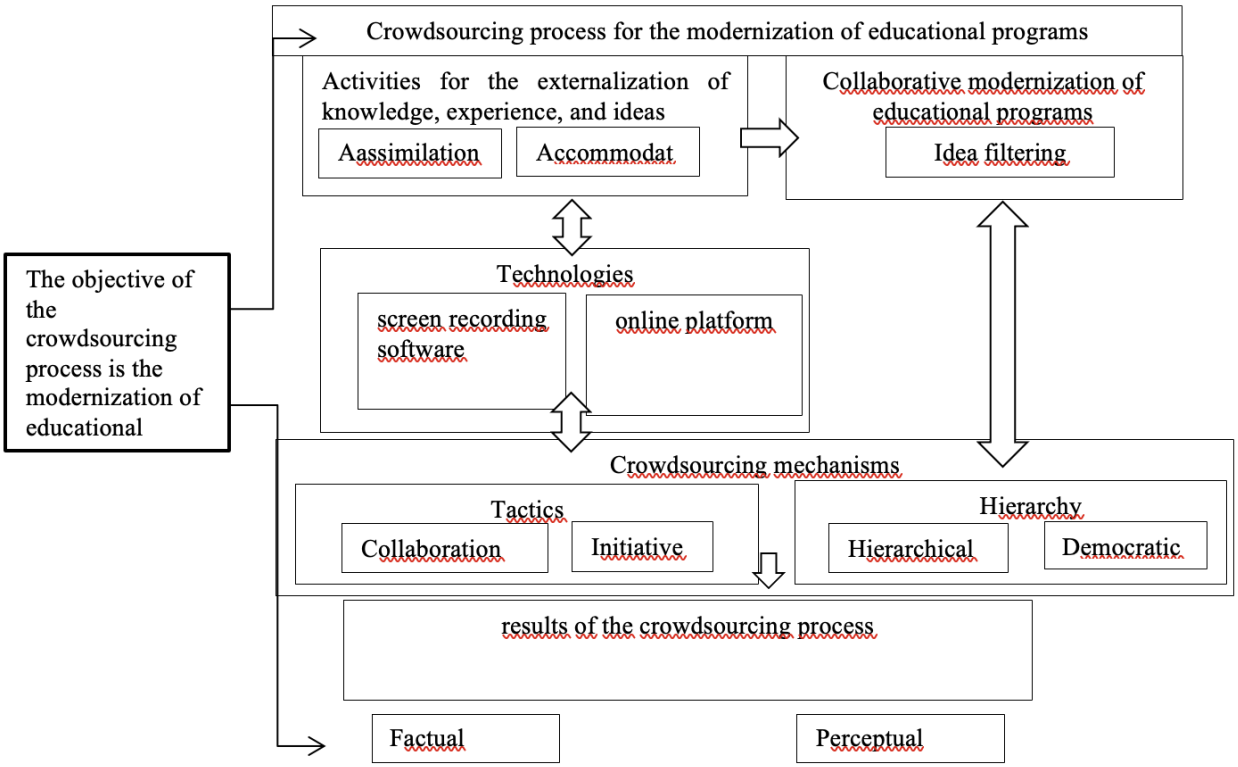
Among potential employers, a moderate level of satisfaction with the quality of the educational programs prevails (M = 6.5). Overall, potential employers believe that theoretical knowledge does not sufficiently correspond to qualification requirements, that the content of educational programs does not fully take into account employers' expectations, and so on.

Most practitioner graduates expressed dissatisfaction with the quality of the program content (M = 7.9). They argue that the set of competencies developed within the educational programs does not adequately reflect the professional activities undertaken after graduation, and that the stated priorities of the programs do not ensure proper performance of tasks arising in the production sphere, among other concerns.

The developed model of the crowdsourcing process for the modernization of educational programs corresponds to the "Input – Process – Output" framework. The model is presented in Figure 2. Between the crowdsourcing task and the results of the crowdsourcing process lie two key functional layers: the activities of externalizing knowledge, experience, and ideas, and the mechanisms of crowdsourcing, which are interconnected through a specific technology (Figure 2).

Figure 2

Model of the Crowdsourcing Process for Educational Program Modernization



In the course of the crowdsourcing process, participants transform their experience and knowledge into information that is discussed and refined through external assimilation and accommodation. External assimilation implies adding new content to existing information without altering the core idea, whereas external accommodation involves editing and reorganizing the content. Afterward, the best ideas are selected for inclusion in the educational program content.

The mechanisms of crowdsourcing include the following components: the behavior of the subjects, strategies for encouraging participation, and the hierarchy within the crowd's workflow. The term "subjects" refers to the participants of the crowdsourcing process and the crowdsourcers (university representatives). Managing a crowdsourcing (collaborative) network is a specific task of the crowdsourcer, which involves determining the strategy and hierarchy of the crowd's work. Strategy refers to a combination of various crowdsourcing mechanisms aimed at achieving collaboration (personal, social, and compensatory). Hierarchy implies both hierarchical and democratic modes of managing crowdsourcing participants.

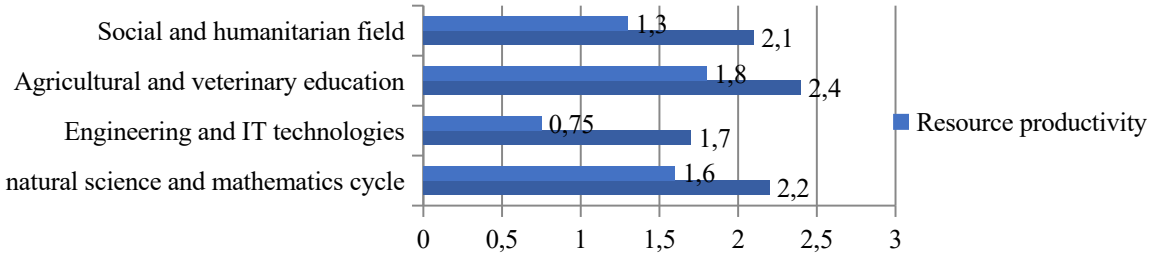
The technological aspect of the crowdsourcing model is associated with the use of various technologies, such as screen-recording software, video presentations, and the crowdsourcing platform itself. The results

of the crowdsourcing process can be factual and perceptual. Factual results refer to the number of modernized educational programs. Perceptual results are based on participants' perceptions of their satisfaction with the work accomplished.

An assessment of the effectiveness of the factual results of using crowdsourcing in the modernization of educational programs in terms of resource intensity and resource efficiency is presented in Figure 3.

Figure 3

Results of the Assessment of Resource Intensity and Resource Efficiency of Crowdsourcing in the Modernization of Educational Programs



As shown in Figure 3, the highest weighted values in terms of resource intensity and resource efficiency of educational crowdsourcing were observed in educational programs in the field of agricultural and veterinary training (X = 2.4 and X = 1.8). The lowest values were found in programs related to engineering and IT technologies (X = 1.7 and X = 0.75). Overall, it can be noted that the level of resource intensity is relatively high, which indicates a substantial number of ideas and proposals generated by crowdsourcing participants for the modernization of educational programs. At the same time, a correlation is observed between the indicators of resource intensity and resource efficiency: the higher the resource intensity, the higher the resource efficiency, and vice versa.

The assessment of the effectiveness of the perceptual results was conducted through a comparative analysis of the online interview results before and after the modernization of the educational programs, based on the criterion of satisfaction with their quality (Table 2).

Table 2

Summary Table of Statistical Data on Satisfaction Levels Before and After the Modernization of Educational Programs

№	Crowdsourcing participants	High degree			Medium degree			Dissatisfaction		
		X_1	X_2	t- Student's t-test	X1	X2	t- Student's t-test	X1	X2	t- Student's t-test
1	Prospective students	8,5	9,8	2,6*	7,6	5,5	2,5*	3,0	1,5	2,18*
2	Potential employers	2,5	7,9	2,31*	6,5	6,2	1,18	3,2	1,7	2,27*
3	Internship graduates	1,13	5,4	3,24*	5,4	6,7	2,23*	7,9	2,1	3,14*

Note: X1 – sample mean before the modernization of the educational program; X2 – sample mean after the modernization of the educational program. * – indicators marked with an asterisk have significance levels of $p < 0.01$ or $p < 0.05$ according to Student's t-test.

A comparative analysis of the mean values (X) before and after the crowdsourcing process showed that the level of high satisfaction with the educational programs among all categories of crowdsourcing participants (students–applicants, potential

employers, and practitioner graduates) was significantly higher after the modernization of the programs ($t = 2.6$ to 3.24, $p > 0.01$). The Student's t-test indicates the presence of substantial differences in the indicators of dissatisfaction with the programs. For instance, the level of dissatisfaction among student–applicants before the crowdsourcing process was significantly higher than after the modernization of the programs ($t = 2.18$, $p < 0.05$). A similar pattern was observed among potential employers ($t = 2.27$, $p < 0.05$) and practitioner graduates ($t = 3.14$, $p < 0.05$). These findings indicate an increase in the level of satisfaction with the educational programs following their modernization based on crowdsourcing results.

Furthermore, it was identified that after the modernization, the number of students–applicants with a moderate level of satisfaction significantly decreased ($t = 2.5$, $p < 0.05$), whereas the degree of moderate satisfaction increased notably among practitioner graduates ($t = 2.23$, $p < 0.05$). Among potential employers, no statistically significant differences were found for the indicators of moderate satisfaction ($t = 1.18$, $p > 0.05$).

Thus, it can be concluded that after the modernization of the educational programs, the proportion of crowdsourcing participants with a high level of satisfaction with the program quality increased substantially, while the number of dissatisfied participants decreased significantly. At the same time, the dynamics of moderate satisfaction varied across students–applicants, potential employers, and practitioner graduates.

Discussion. The issue under consideration has emerged as a result of the rapid obsolescence of knowledge and the instability of the labor market; if these factors are not taken into account, the employability of graduates will remain uncertain (Alyahya, 2020). Furthermore, an analysis of the scholarly literature revealed that the potential of applying crowdsourcing technology in education remains insufficiently explored within pedagogical science. In particular, there is a problem of adapting the practical implementation of crowdsourcing technology to the specifics of the national higher education system due to the lack of theoretical and methodological foundations and diagnostic tools for assessing the effectiveness of educational crowdsourcing outcomes (Lin & Ding, 2023). The results of the online interviews assessing the satisfaction with and relevance of the educational programs implemented at the university confirmed the need for their modernization in accordance with labor market demands. Although most students and applicants expressed satisfaction with the quality of the programs, the majority of potential employers and practitioner graduates indicated that the content of the programs does not adequately correspond to the realities of professional practice. The high level of satisfaction among students and applicants may be attributed to their limited professional and life experience, which prevents them from having a full understanding of the competencies required in their future profession, as well as to psychological characteristics of adolescence, such as maximalism, manifested in insufficient flexibility of judgment and a tendency toward exaggeration in conclusions and viewpoints (Hanine, & Steils, 2018).

The study of successful international practices in the use of crowdsourcing technologies made it possible to implement a model of the crowdsourcing process for the modernization of educational programs (Martinez, 2017). The distinct feature of this model lies in its simplicity, the absence of financial expenses, and the provision of interaction among all participants at every stage, clarifying who is responsible for what throughout the process and specifying how the stages of the crowdsourcing process are interconnected. Each stage has its own purpose and implementation logic. By following these stages, any educational organization can carry out a crowdsourcing project using its own internal resources (Schafhäutle & Veenman, 2024).

A comparative analysis of the online interview results before and after the

modernization of the educational programs according to satisfaction levels supports the findings of numerous studies on the effectiveness of crowdsourcing in addressing educational challenges (Geetha et al., 2023; Likhachev, 2016). Specifically, a positive trend was identified: an increase in the number of crowdsourcing participants with a high level of satisfaction and a significant decrease in those dissatisfied with the quality of the programs after their modernization. This trend is evidenced by the mean values obtained before and after the crowdsourcing process.

The study also revealed a high level of resource intensity in the crowdsourcing process for the modernization of educational programs, as well as a direct relationship between resource efficiency and resource intensity. The results align with previous research on the specifics of evaluating crowdsourcing in the banking sector (Ansell & Gash, 2018). Moreover, in contrast to economic assessments of resource intensity, where higher resource intensity typically implies lower resource efficiency due to reduced profits and profitability indicators (Girshin & Gajek, 2021), in educational crowdsourcing, the opposite can be asserted: the higher the resource intensity, the higher the resource efficiency. That is, the more ideas and proposals generated for addressing an educational problem, the greater the likelihood that these ideas will be adopted for implementation. This assertion is further supported by the comparative analysis of satisfaction and relevance levels before and after the modernization of educational programs carried out through the crowdsourcing project.

Conclusion. The conducted study has expanded the scope of applying crowdsourcing in education, particularly in the modernization of educational programs within the system of higher professional education. The findings revealed a discrepancy between the educational programs implemented at the university and the requirements of the labor market. An examination of best practices in the use of crowdsourcing in education made it possible to adapt a model of the crowdsourcing process for the modernization of educational programs to the specifics of the Kazakhstani system of higher professional education.

The mechanisms of adaptation included the detailed mapping of interaction flows among all participants at each stage of the crowdsourcing process, as well as the specification of the goals and unique characteristics of each stage. The study confirmed the effectiveness of using crowdsourcing to address educational challenges. A positive trend was established, indicating an increase in the number of participants with a high level of satisfaction and a decrease in those dissatisfied with the quality of educational programs after their modernization based on the crowdsourcing project. Furthermore, the study identified a high level of resource intensity in educational crowdsourcing and a direct relationship between resource efficiency and resource intensity. It was concluded that the higher the resource intensity of educational crowdsourcing, the higher its resource efficiency.

Thus, the use of crowdsourcing in the educational sector not only enabled the modernization of educational programs in accordance with labor market requirements but also strengthened the feedback loop between universities and the consumers of educational services. The implemented model of the crowdsourcing process for modernizing educational programs can also be applied to other educational tasks requiring collective decision-making, while the proposed diagnostic tools for evaluating crowdsourcing outcomes can enhance the quality of crowdsourcing projects in education.

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Psychological and Pedagogical Problems of Professional Development of Education Specialists

Original Article
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Personal Branding in the Structure of Professional Development of Students Studying in Pedagogical and Psychological Specialties

Abstract

Introduction. The study considers personal branding as a manageable component of professional development in pedagogy and psychology students, where credibility depends on ethically grounded self-presentation, a clear professional identity, and trust-based communication in educational and community settings. The research explores how personal branding takes shape during university training and which components are more or less developed across years of study and practicum experience. *Methodology and Methods.* A quantitative, cross-sectional descriptive–comparative design was implemented at Sarsen Amanzhaolov East Kazakhstan University, Ust-Kamenogorsk, Kazakhstan. The sample comprised 79 undergraduate students. Personal branding was assessed with a structured 1–5 scale instrument covering five components: value proposition, communication, reflection, digital footprint, and reputation signals; an overall index was computed as the mean of component scores. Data were analyzed using descriptive statistics, course-level comparisons (ANOVA), and practicum-experience comparisons (t-tests), with effect sizes estimated where relevant; no intervention or pre–post design was used. *Results.* Overall, personal branding was predominantly moderate. Reflection and communication scored highest, indicating stronger reflective and communicative resources. Digital footprint and reputation signals were weaker, suggesting limited strategic visibility and insufficient evidence-based self-presentation. Differences across years of study were associated with clearer role articulation and reflective maturity, while practicum experience related more to reputation evidence and portfolio-oriented presentation of competencies. *Scientific novelty.* The study offers an integrative, domain-based interpretation of personal branding in pedagogy and psychology education, showing how value orientation, competence demonstration, and ethically regulated communication shape coherent professional self-presentation, and distinguishing components linked to academic progression versus practicum practical *significance.* The findings support curriculum improvements: modules on professional identity and ethics, structured digital portfolios aligned with confidentiality standards, and mentoring-based supervised visibility practices.

Keywords: personal branding; professional development; pedagogical psychology students; professional identity; digital footprint; employability.

Introduction. In modern higher education, the professional development of students in pedagogical and psychological programmes is determined not only by academic performance and practical training, but also by the ways in which future specialists position themselves within educational and social contexts. As universities prepare graduates for employment in schools, counselling services, inclusive environments, and community institutions, the ability to clearly express a professional identity, convey expertise, and establish trust with diverse audiences becomes an essential applied skill. Within this framework, personal branding can be understood as a deliberate and consistent process of shaping and sustaining a professional image based on values, professional competencies, ethical standards, and demonstrable conduct. For pedagogical psychologists, whose professional activity relies on interpersonal communication, confidentiality, and social responsibility, the development of a personal brand should not be interpreted as self-promotion, but rather as a means of professional self-definition, strengthening credibility and supporting long-term career development.

Although personal branding has attracted increasing attention in business and media studies, its place within the professional formation of students enrolled in pedagogical and psychological programmes remains weakly articulated in teacher education and psychology training. Many students encounter difficulties in consolidating separate competencies into a coherent professional stance: solid theoretical preparation is often accompanied by limited communicative confidence, insufficient reflective self-presentation, or an unclear perception of their professional purpose. Such imbalances may result in uncertainty during practicum placements, inconsistent communication with teachers, parents, and learners, and a low level of readiness for professional networking and lifelong professional growth. In this regard, the analysis of personal branding as a structural element of professional formation is of clear relevance for educational theory as well as for the renewal of university practices focused on the development of soft skills, professional identity, and graduate employability.

This article aims to examine the role and functions of personal branding within the structure of professional development of students enrolled in pedagogical psychology programmes and to substantiate its pedagogical significance for reinforcing professional identity, communication culture, and readiness for future careers. The study explores the links between core elements of personal branding values, professional competencies, self-presentation practices, digital presence, and professional reputation, and the main stages of professional formation throughout university education. The practical value of the article is associated with the application of the results to the development of curriculum-based recommendations, including workshops, reflective learning components, mentoring formats, and digital portfolio tools, which can assist students in forming an ethical, coherent, and socially responsible professional image consistent with the norms and expectations of psychological and pedagogical practice.

Materials and Methods. The study adopted a quantitative, cross-sectional, descriptive, and comparative design to investigate personal branding as an element of professional development among students enrolled in pedagogical and psychological programmes. The research framework integrated descriptive analysis of key personal branding components with comparative assessments across groups differentiated by stage of study and practicum experience.

Participants. The participants were undergraduate students enrolled in pedagogical and psychological programmes at Sarsen Amanzhaolov East Kazakhstan University, Ust-Kamenogorsk, Kazakhstan. The final sample included 79 students in their second to fourth year of study. The sample size reflected actual cohort availability during the data-collection period, which is common

in single-institution research in pedagogical psychology education. The participants' mean age was 20.9 ± 1.3 years. To explore differences associated with field experience, the students were grouped according to whether they had practical experience in education or psychology (e.g., school-based practicum, volunteering, tutoring, or counselling-related activities).

Inclusion criteria consisted of current enrolment in the relevant programme, completion of at least one semester of professional coursework, and provision of informed consent to participate in the study. Exclusion criteria included questionnaires containing substantial missing data or incomplete responses that did not allow for the calculation of composite scores.

Data Collection Tools. Personal branding was measured with a structured questionnaire covering five components relevant to professional formation in the helping professions: value proposition (clarity of professional mission, understanding of one's role, articulation of strengths and values); communication (ability to present oneself professionally, maintain constructive interaction and adapt messages to different audiences); reflection (analysis of one's experience, awareness of development needs and capacity to learn from feedback); digital footprint (purposeful online presence, portfolio practices and understanding of digital professionalism); and reputation signals (indicators of competence such as supervisor feedback, participation in projects and documented achievements). All components were rated on a unified 1–5 Likert scale, with higher scores reflecting stronger development. An Overall Personal Branding Index was calculated as the mean of the five component scores.

For interpretative purposes, the overall index was divided into three levels (low, medium, and high) using distribution-based thresholds (for example, tertiles corresponding to the 33rd and 66th percentiles) to facilitate visualization and group comparisons. In addition, a brief self-assessment of baseline professional readiness was collected on a 1–5 scale and used as an initial indicator to ensure comparability between subgroups.

Procedure. Data collection took place during the academic term using classroom-based and, where appropriate, online survey formats. Participation was voluntary, and students completed the questionnaire individually and anonymously. All responses were checked for completeness; the proportion of missing data was below 5% and was addressed through listwise deletion when calculating composite indices.

Data Analysis Technique. Data were analyzed using standard statistical procedures. Descriptive statistics (means, standard deviations, frequencies, and percentages) were computed first. Baseline differences between subgroups were checked using independent-samples t-tests for continuous variables (age and baseline readiness) and chi-square tests where appropriate. Differences by year of study were examined with one-way ANOVA, while practicum-experience effects were tested with independent-samples t-tests for both component scores and the overall index. Internal consistency for the total scale and each subscale was assessed with Cronbach's alpha. Statistical significance was set at $p < 0.05$, and effect sizes (Cohen's d, η^2 and Cramer's V) were reported where applicable to support interpretation of practical relevance.

Ethics. The study adhered to established ethical standards, including voluntary participation, informed consent, confidentiality and anonymization. All data were processed in aggregated form and used solely for research purposes. Participants were free to withdraw from the study at any point without any consequences. The research was confined to an ascertaining (baseline) stage based on a cross-sectional survey design. No formative intervention, training programme, or pre–post assessment was conducted within the scope of this study; accordingly, the findings reflect cohort-specific characteristics rather than the effects of any intervention.

Results. Personal branding is often defined as a deliberate approach to shaping how others perceive an individual's professional value, expertise, and credibility. Early managerial discussions presented it as the necessity of treating oneself as "a brand" within an increasingly individualized labor market (Peters, 1997). Subsequent practitioner-focused publications translated this idea into practical terms through positioning, differentiation, and the consistent communication of professional signals (Montoya & Vandehey, 2002). For students in pedagogy and psychology, however, personal branding should not be equated with self-promotion; rather, it can be understood as an ethically and professionally grounded way of communicating competence, values, and role boundaries within helping relationships.

Academic research has further refined the concept by distinguishing between the personal brand as an outcome, reflected in relatively stable perceptions, and personal branding as the ongoing process through which these perceptions are formed and managed. A systematic review highlights personal branding as a career-related activity shaped by changes in the labor market and mediated by identity work, reputation cues and social validation (Gorbatov et al., 2018). From this perspective, a personal "brand" develops through repeated interactions and sustained narratives of competence and trustworthiness, rather than through a single communicative act.

One prominent stream of research links personal branding to employability. Empirical evidence suggests that personal branding is related to perceived employability and career outcomes, although these relationships are often indirect and contingent on context, available resources, and the credibility of communicated signals (Khedher, 2019). From an educational standpoint, this supports viewing personal branding as a set of teachable competencies such as self-presentation, reflective articulation of strengths, portfolio development, and communication strategy rather than as a purely market-oriented ideology. In a similar context, models of "self-marketing brand skills" argue that universities can foster students' capacity to translate their competencies into clear value propositions for employers and professional communities (Manai & Holmlund, 2015). Issues of employment are also examined through the lens of student competitiveness and academic mobility as integral elements of educational trajectories, which further underscores the importance of coherent professional self-presentation already during the period of study (Duisekeyeva & Kadirsizova, 2020).

The digital environment has become a key arena for personal branding, as it accumulates, amplifies, and recombines reputational signals. Studies of online personal branding in the context of Web 2.0 point to challenges such as fragmented audiences, blurred boundaries between private and professional spheres, and the difficulty of maintaining coherence across multiple platforms (Labrecque et al., 2011). These challenges are particularly relevant for pedagogical psychologists, whose professional legitimacy depends on confidentiality, ethical behavior, and trust-based relationships; as a result, digital traces and communication style form an integral part of professional credibility and responsible self-presentation.

At the psychological level, personal branding intersects with established theories of self-presentation and impression management. Goffman's dramaturgical approach describes how individuals enact roles and regulate impressions in social encounters, offering a foundational perspective for viewing a "brand" as an identity negotiated through interaction (Goffman, 2023). The two-component model of impression management differentiates between impression motivation and impression construction, which helps explain why people may deliberately foreground particular competencies and values in professional settings (Leary & Kowalski, 1990). For students, these processes are shaped by academic assessment, practicum

requirements, and peer comparison, influencing both what they communicate and the degree of consistency with which they present themselves.

To link personal branding with professional development in pedagogical and psychological education, research on professional identity is especially relevant. Reviews of teacher professional identity describe it as dynamic, context-sensitive, and constructed through experience, reflection, and participation in professional communities (Beijaard et al., 2004). A dialogical perspective further suggests that professional identity is both unified and multiple, encompassing different "I-positions" (such as counsellor, educator, or mediator) that need to be coordinated rather than suppressed (Akkerman & Meijer, 2011). This perspective offers a solid theoretical foundation for examining personal branding as a structured expression of professional roles and values, representing the outward articulation of an internally integrated professional identity.

Research that foregrounds the "person of the professional" highlights that teachers' and other helping professionals' actions cannot be separated from who they are, how they interpret their responsibilities, and how they attribute meaning to their practice (Kelchtermans, 2009). In the case of pedagogical psychologists, personal branding is therefore closely linked to professional self-understanding, including the ability to articulate one's mission, ethical boundaries, modes of intervention, and communication norms. In addition, narrative and career-construction approaches propose that professional trajectories are shaped through life themes and processes of meaning-making, with narratives enabling individuals to integrate competencies and experiences into coherent vocational stories (Del Corso & Rehfuss, 2011). Recent syntheses of career-construction theory further confirm the importance of identity- and narrative-based tools for career decision-making and professional adaptation (Wang & Li, 2024). Taken together, these perspectives justify examining personal branding in higher education as an identity-oriented, ethically constrained, and competency-based element of professional formation among students in pedagogical and psychological fields.

The study included undergraduate students enrolled in pedagogical psychology programmes at a higher education institution. Participants were at different stages of professional training, which allowed personal branding indicators to be examined in relation to year of study and practical experience. The inclusion criteria were:

- current enrolment in a pedagogical or pedagogical-psychological programme;
- completion of at least one semester of professional coursework;
- provision of informed consent to participate.

Students who submitted incomplete questionnaires were excluded from the final analysis.

The final sample reflected the typical cohort profile of pedagogical psychology programmes. The distribution across years of study was sufficient for descriptive and comparative analyses, while the gender composition was predominantly female, with male students representing a small minority. The sample also showed meaningful variation in pedagogical and psychological practicum experience. Data completeness was high: missing responses accounted for less than 5% and were managed through listwise deletion, as they did not affect the overall structure of the dataset. For analytical purposes, students were additionally classified according to whether they had practical experience (e.g., school-based placement, volunteering, tutoring, or counselling-related activities) or not.

Baseline comparability analyses indicated no statistically significant differences between the practicum-experience subgroups in terms of age or initial self-assessed professional readiness ($p > 0.05$), which permitted subsequent comparisons without further statistical adjustment. Owing to the small proportion of male students in the cohort, gender was not treated as a primary stratification variable, and any observed

gender-related patterns were interpreted with caution (Table 1).

Table 1

Sample characteristics and baseline indicators

Indicator	Category / Value	n (%) / Mean (SD)
Total sample size	—	79 (100%)
Course level	2nd year	26 (32.9%)
	3rd year	28 (35.4%)
	4th year	25 (31.6%)
Gender	Female	69 (87.3%)
	Male	10 (12.7%)
Practical experience in education/psychology	Yes	44 (55.7%)
	No	35 (44.3%)
Age (years)	Mean (SD)	20.9 (1.3)
Baseline professional readiness score	Mean (SD)	3.21 (0.54)
Missing data	—	< 5%

This sample profile suggests that the participants constitute a typical single-institution cohort of pedagogical psychology students, offering a sufficient basis for examining personal branding components within the context of their professional development. At the same time, the pronounced gender imbalance should be taken into account when interpreting subgroup comparisons.

A descriptive analysis was carried out to assess the level of development of key personal branding components among students in pedagogical and psychological programmes. The assessment encompassed five core dimensions: value proposition, communication, reflection, digital footprint, and reputation signals measured on a unified five-point scale, with higher scores indicating a more advanced level of development.

As presented in Table 2, the highest mean scores were recorded for reflection and communication, indicating that most students demonstrate comparatively strong capacities for analyzing professional experience, articulating personal strengths, and interacting effectively in educational settings. These dimensions align with reflective practices and interpersonal communication skills, which are typically emphasized in pedagogical and psychological training.

Moderate scores were observed for the value proposition component, suggesting that although students have a general understanding of their professional mission and competencies, they often struggle to articulate a clear and differentiated professional positioning. The lowest mean values were found for digital footprint and reputation signals, indicating limited awareness of purposeful online self-presentation, professional visibility and reputation management in both digital and offline professional communities.

Table 2

Descriptive statistics for personal branding components

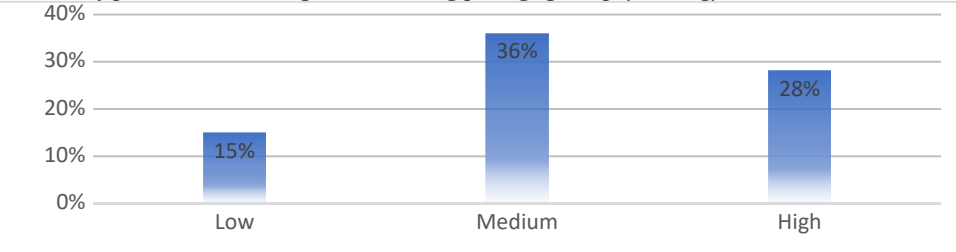
Personal branding component	Mean (M)	Standard deviation (SD)
Value proposition	3.34	0.61
Communication	3.78	0.57
Reflection	3.85	0.54
Digital footprint	2.96	0.68
Reputation signals	3.02	0.64
Overall personal branding index	3.39	0.49

To provide a more integrated perspective, students were also classified into three levels of overall personal branding development (low, medium and high) based on their composite index scores. The distribution across these levels is shown in Figure 1. The findings indicate that the medium level predominates, suggesting that

basic elements of personal branding are present but are not yet supported by sufficient consistency or strategic coherence. A smaller share of students demonstrated a high level, whereas a limited group fell into the low level, characterized by weak professional self-presentation and low awareness of reputation-building practices.

Figure 1

Distribution of personal branding levels among pedagogical psychology students



Overall, the descriptive findings point to an uneven development of personal branding components: reflective and communicative competencies appear relatively well developed, whereas strategic positioning and digital professional visibility remain comparatively weaker. This pattern corresponds with the predominance of the medium level of overall personal branding observed within the cohort (Figure 1).

This subsection provides an analytical examination of how the core components of personal branding are embedded within the main domains of professional development among pedagogical psychology students. Consistent with the professional formation framework applied in the study, three integrative domains were considered: motivational–value, activity/practice-based, and reflective–communicative. As illustrated in Table 3, personal branding should not be treated as an isolated "self-presentation skill"; instead, it brings together value orientation (why the profession is chosen), professional action (what can be done in practice), and reflective communication (how experience is analyzed, messages are conveyed, and trust is established).

The value proposition component is primarily associated with the motivational value domain, as it reflects clarity of professional mission, ethical positioning, and the ability to articulate one's professional role. Communication and reflection constitute the core of the reflective communicative domain and are central to the work of future pedagogical psychologists, whose professional activity is grounded in dialogue, empathy, and self-regulation. Digital footprint and reputation signals are conceptually connected to the practice-based domain, as they represent professional visibility through portfolios, participation in projects, supervisory feedback, and other evidence of competence in real educational contexts.

Table 3

Personal branding components and domains of professional development

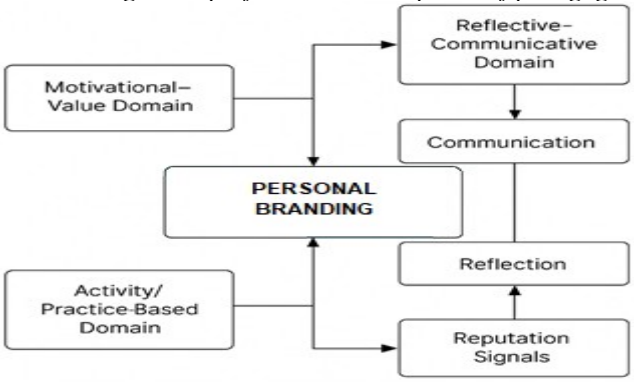
Personal branding component	Motivational–value domain	Activity/practice-based domain	Reflective–communicative domain
Value proposition	High	Medium	Medium
Communication	Medium	Medium	High
Reflection	Medium	Medium	High
Digital footprint	Low–Medium	High	Medium
Reputation signals	Medium	High	Medium

To explore possible differences across stages of training, descriptive comparisons were made by year of study and by the presence or absence of practicum experience. The observed pattern aligns with the assumption that progression through the Programme is associated with clearer articulation of professional roles and more developed reflective–communicative skills, whereas practicum experience is more closely

related to practice-based indicators, particularly reputation signals (such as supervisor feedback and project participation) and purposeful digital representation (including portfolio materials and documented achievements). Given the descriptive design of the study and its single-institution sample, these differences are interpreted as cohort-specific tendencies rather than as causal effects. The conceptual integration of these patterns is summarized in Figure 2.

Figure 2

Conceptual model of personal branding in the professional development of pedagogical psychology students



This conceptually presents personal branding as emerging from the interaction between internal work on professional identity (values and meaning), the demonstration of competence through experience, and reflective communication, together with ethical self-presentation in both offline and online environments.

Discussion. The findings reinforce the view that personal branding in pedagogical psychology education should be understood as identity-based professional communication rather than as market-oriented self-promotion. The predominance of a medium overall level (Figure 1) indicates that most students have basic resources for professional self-presentation, but their branding lacks sufficient consistency and strategic orientation, particularly with regard to visibility and reputation management. This pattern is consistent with the argument that personal branding represents a long-term, socially validated process grounded in identity work and recurring reputation signals (Gorbatov et al., 2018), rather than a one-off exercise in "image creation" (Peters, 1997).

One notable finding is that reflection and communication scored higher than digital footprint and reputation signals (Table 2). From a psychological standpoint, this difference is understandable: reflective and interpersonal skills are strongly emphasized in the preparation of helping professionals and are closely related to impression management in everyday interaction (Goffman,2023; Leary & Kowalski, 1990). By contrast, weaker results in the digital-professional dimension suggest that students may not consistently translate their competencies into evidence-based professional narratives, such as portfolio artefacts, documented achievements or purposeful professional networking. This observation is consistent with research indicating that online personal branding is complicated by fragmented audiences and blurred boundaries between private and professional life (Labrecque et al., 2011), which may be particularly sensitive for pedagogical psychologists given ethical requirements and the trust-based nature of their work.

The alignment of personal branding components with professional development domains (Table 3; Figure 2) further supports the interpretation of personal branding as an externalized expression of professional identity. Professional identity is commonly described as dynamic and shaped through practice, reflection and participation in

professional communities (Beijaard et al., 2004), while dialogical approaches highlight the need to coordinate multiple role positions (Akkerman & Meijer, 2011). From this perspective, students' difficulties in articulating a clear value proposition may indicate an incomplete integration of professional roles and self-understanding – students may "know what to do" in practical terms, yet still struggle to articulate "who they are as professionals" in a coherent manner (Kelchtermans, 2009). Moreover, the descriptive comparisons by practicum experience align with employability-oriented research showing that personal branding outcomes depend on the credibility of signals and the accumulation of evidence of competence (Khedher, 2019).

The findings support the integration of personal branding into professional formation through ethically grounded, competency-based approaches, including:

- professional identity and ethics modules that address role clarity, professional boundaries, core values and responsible self-presentation;
- structured digital portfolio practices (case reflections, practicum outputs, supervision records and project results) designed to enhance digital footprint and reputation signals while adhering to confidentiality requirements;
- mentoring and supervised forms of professional visibility involving faculty members and field supervisors, aimed at helping students translate practicum experience into credible professional narratives;
- communication skills training with structured feedback loops, including simulated interviews and parent–teacher interaction scenarios followed by reflective debriefing.

Several limitations should be noted. First, the cross-sectional design restricts causal interpretation and does not allow analysis of how personal branding develops across stages of training. The absence of a formative intervention or pre–post assessment further limits conclusions regarding change over time and the effectiveness of specific educational practices. Second, the study relied primarily on self-report measures, which may be affected by social desirability bias and individual differences in self-awareness. Third, the sample was limited to a single institution and region; moreover, the gender distribution was predominantly female, reflecting the cohort structure but constraining the generalization of findings across genders.

Future research should prioritize longitudinal designs that track the development of personal branding across multiple semesters and practicum cycles; intervention studies that test the effectiveness of identity-focused modules, portfolio-based training and mentoring programmes; and multi-source assessment approaches that combine self-reports with supervisor evaluations, portfolio analytics and structured observations of professional communication. Further attention should be given to ethical issues related to digital visibility in helping professions, as well as to potential moderating factors such as the intensity of mentoring, the quality of practicum experiences and students' prior levels of digital literacy.

Conclusion. This study analyzed personal branding as a structural component of professional development among students enrolled in pedagogical and psychological programmes. The findings suggest that, in this field, personal branding is most appropriately understood as identity-based professional communication grounded in ethical standards, responsibility and trust, rather than as market-driven self-promotion. Overall, the descriptive results indicate that students have a basic foundation for developing a coherent professional image; however, the development of specific personal branding components remains uneven and may require targeted pedagogical support.

The descriptive results indicate that reflection and communication are the most developed components of personal branding among the participants, which corresponds to the strong emphasis on interpersonal competence and reflective practice in

pedagogical psychology education. At the same time, digital footprint and reputation signals were comparatively less developed, pointing to limited strategic awareness of professional visibility, evidence-based self-presentation, and systematic reputation building in both online and offline professional settings. The predominance of a medium overall level of personal branding further suggests that students generally display professional intentions and core competencies, but often lack consistency and clarity in positioning and in translating their achievements into credible professional signals.

The conceptual mapping of personal branding components to the domains of professional development (motivational value, activity/practice-based, and reflective communicative) supports the view that personal branding serves as an integrative mechanism linking professional identity, the demonstration of competence, and ethically regulated self-presentation. Year of study and practicum experience showed descriptive associations with different aspects of branding: more advanced stages of training tended to align with clearer role articulation and greater reflective communicative maturity, whereas practicum experience was more closely connected to practice-based components, particularly reputation signals and purposeful digital representation. Taken together, these findings underline the importance of linking identity work with authentic professional evidence and reflective communication.

The practical significance of the study lies in identifying directions for enhancing university training. The results support the integration of personal branding into professional formation through modules focused on professional identity and ethical self-presentation, structured digital portfolio practices that document competencies and achievements while respecting confidentiality requirements, and mentoring, together with supervised opportunities for developing professional visibility and communication skills. Such approaches may assist students in translating their academic learning and practicum experience into a coherent, credible, and socially meaningful professional image that aligns with the standards of pedagogical and psychological practice.

At the same time, the study is limited by its cross-sectional design, its reliance on self-report measures, the single-institution nature of the sample, and the predominantly female gender distribution typical of the Programme. Future research should broaden the empirical base, employ longitudinal and intervention-based designs, and incorporate multi-source assessment (supervisor evaluations, portfolio analysis, and structured observation). Additional attention is also required to address the ethical challenges of digital self-presentation in the helping professions and to identify the educational conditions that most effectively support sustainable personal branding as part of professional development.

In summary, personal branding appears as a relevant and pedagogically manageable component of professional formation for students in pedagogical psychology. When embedded in processes of identity development, supported by practicum-based evidence and guided by ethical communication, it can enhance employability, professional confidence, and readiness for responsible practice in educational and community contexts.

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Developing Environmental Thinking in Teacher College Students Through Intellectual Project-Based Activity

Abstract

Introduction. The development of environmental thinking is an important objective of contemporary teacher education, driven by global environmental challenges and the need for environmentally responsible professional behavior. In teacher colleges, however, environmental education often remains fragmented and insufficiently practice-oriented, which limits students' readiness for real-life environmental decision-making. *Methodology and Methods.* The study employed a mixed-methods design and was conducted as a pedagogical experiment during the 2024–2025 academic year. The research involved students of teacher training colleges. Data were collected through questionnaires, situational tasks, and expert assessment of project activities aimed at diagnosing cognitive, value-motivational, and behavioral-reflective components of environmental thinking. Quantitative data were processed using descriptive statistics and comparative analysis. *Results.* The findings indicate a positive dynamic in the development of environmental thinking following the implementation of intellectual project-based learning. A decrease in the proportion of students with a low level of environmental thinking and an increase in medium and high levels were observed. The most significant changes occurred in the behavioral-reflective component, demonstrating a shift from declarative knowledge to environmentally responsible behavior. Interrelations between the structural components of environmental thinking were also identified. *Scientific novelty.* The study substantiates the effectiveness of intellectual project-based activity as an integrated pedagogical tool for developing environmental thinking in teacher colleges. *Practical significance.* The results can be used in teacher training colleges to improve environmental education through the integration of project-based activities into existing curricula.

Keywords: pedagogical technologies; environmental thinking; environmental education; project-based learning; intellectual and project-based activity; secondary vocational education.

Introduction. In the context of contemporary environmental challenges, the formation of environmental thinking is increasingly recognized as a key objective of modern education. Climate change, ecosystem degradation, and growing anthropogenic pressure on natural resources require not only technological solutions, but also the development of stable value orientations and responsible patterns of behavior. In this regard, teacher education plays a particularly important role, as future teachers act as mediators of environmental values and influence students' attitudes and behavioral models.

In pedagogical and psychological research, environmental thinking is commonly understood as an integrative construct that combines environmental knowledge, value-based orientations and readiness for environmentally responsible action. Numerous studies emphasize that the possession of environmental knowledge alone does not automatically lead to environmentally responsible behavior. Researchers point to a persistent gap between cognitive awareness and practical action, which indicates the limitations of traditional approaches to environmental education (Babikov & Maladaeva, 2022).

This problem is especially evident in the system of vocational and teacher education. Empirical studies demonstrate that environmental training at this level is often fragmented and primarily focused on the transmission of theoretical information. Such an approach provides insufficient conditions for the development of reflective skills and behavioral components of environmental thinking, as a result of which environmental issues are perceived by students as abstract and weakly connected with their future professional activity (Titova, 2022; Smirnova, 2023).

One of the promising ways to overcome these limitations is project-based learning. Research shows that project-oriented educational environments enable the integration of theoretical knowledge with practical experience, stimulate active learning and foster responsibility for decision-making. Within environmental education, project-based activities allow students to engage with real ecological problems, analyze their causes and consequences, and propose viable solutions grounded in professional practice (Baigunakova et al., 2025).

Studies conducted in higher and vocational education contexts indicate that project-based learning contributes to the development of key competencies, including critical thinking, initiative and environmental responsibility (Mukhametkairov et al., 2025). At the same time, despite the growing theoretical interest in this approach, empirical studies addressing the systematic implementation of project-based learning in teacher training colleges remain limited. In many cases, project activities are applied episodically and do not form a coherent pedagogical system (Kharina et al., 2022; Urunova et al., 2020).

This situation reveals a contradiction between the acknowledged pedagogical potential of project-based learning and its insufficient integration into vocational teacher education practice. Addressing this contradiction requires empirical verification of educational models that combine intellectual engagement with practical, environmentally oriented activities.

The purpose of the present study is to provide theoretical justification and empirical verification of the effectiveness of intellectual and project-based learning as a means of developing environmental thinking among students of teacher training colleges. The objectives of the study include analyzing contemporary approaches to environmental thinking formation, identifying the pedagogical potential of project-based learning, defining criteria and indicators for assessing environmental thinking, and evaluating the effectiveness of the proposed Programme through a pedagogical experiment.

The object of the study is the process of professional training of students in teacher training colleges.

The subject of the study is the development of environmental thinking among students of teacher training colleges under conditions of intellectual and project-based activity.

Given the need not only to diagnose the level of students' environmental knowledge but also to identify the mechanisms that enable the transition from awareness of environmental problems to environmentally responsible behavior, an experimental research design was adopted. This design was focused on analyzing the structural components of environmental thinking and the nature of their interaction, which

determined the choice of research methods and procedures.

This study seeks to examine whether engaging teacher college students in intellectually oriented project-based activities contributes to the development of their environmental thinking, and to assess the extent of this impact through experimental validation.

Materials and Methods. The empirical study was conducted during the 2024–2025 academic year at the teacher training colleges in the West Kazakhstan region. The research design was based on a sequential pedagogical experiment and included three interrelated stages: diagnostic, formative, and control. This design made it possible to trace the dynamics of changes in students' environmental thinking and to assess the impact of the implemented pedagogical intervention.

The experiment was conducted without a control group. The absence of a control group was due to organizational constraints of the educational process. The reliability of the obtained results was ensured through the comparison of data collected at the diagnostic and control stages, as well as through the application of statistical methods of analysis. This approach corresponds to the objectives of the present study and reflects common practices in pedagogical research conducted under real educational conditions.

The formative Programme was integrated into the content of the disciplines Pedagogy, Methods of Teaching Natural Sciences, and Teaching Practice. The experimental work was carried out at the Zh. Dosmukhamedov Higher Pedagogical College (Uralsk) during the spring semester. Students' project activities were organized during the second and third weeks of teaching practice in partner schools. This arrangement provided opportunities to test project ideas in real educational settings and enabled the integration of theoretical knowledge with practical experience.

Participants. A total of 158 students aged 16–20 years, enrolled in pedagogical specializations, participated in the study. A full-population sampling strategy was applied, which ensured the inclusion of all students from the selected academic groups and increased the internal validity of the findings. Most participants were first- and second-year students, which allowed the analysis of environmental thinking formation at the early stages of professional training. The sample was relatively homogeneous in terms of age and educational characteristics.

The methodological framework of the study was based on the system-activity approach and the project-oriented approach. The system-activity approach made it possible to conceptualize the learning process as a dynamic interaction between students, the educational environment, and socially significant tasks. This approach is particularly relevant for environmental education, as it focuses on the integrated development of cognitive, value-based, and behavioral components. The project-oriented approach was aimed at solving practice-oriented problems and contributed to the development of reflective thinking and professional responsibility among students.

Within the framework of the present study, environmental thinking was conceptualized as a multidimensional construct comprising three interrelated components. The cognitive component reflected the level of understanding of environmental problems, the causes of ecological crises, and the principles of sustainable development. The value-motivational component characterized attitudes towards nature, the level of environmental responsibility, and readiness to participate in environmentally oriented activities. The behavioral-reflective component indicated readiness for environmentally responsible actions and the ability to analyze and evaluate one's own behavior.

Data Collection Tools. A set of methods was applied to diagnose the level of environmental thinking. The cognitive component was assessed using a structured questionnaire consisting of 25 items aimed at identifying students' knowledge of key

environmental concepts and issues. The internal consistency of the questionnaire was confirmed by a reliability coefficient of 0.81, indicating a high level of instrument reliability.

The value-motivational component was examined using a modified environmental attitudes scale, which made it possible to assess the level of ecological concern, the sense of personal responsibility, and motivation to participate in environmental initiatives. The behavioral-reflective component was diagnosed through situational tasks requiring the analysis of environmental problem scenarios and the development of practical solutions. In addition, expert assessment of students' project work was conducted based on criteria such as relevance, feasibility, and creativity.

Based on the analysis of theoretical sources and empirical data, three levels of environmental thinking were identified: low, medium, and high. The low level was characterized by fragmented ecological knowledge, weakly expressed value orientations, and a passive attitude towards environmental problems. The medium level reflected the presence of basic environmental knowledge and generally positive attitudes towards environmental protection, while behavioral manifestations remained unstable. The high level was defined by a systemic understanding of environmental problems, internalized ecological values, and readiness for sustainable, environmentally responsible behavior.

At the formative stage, students were involved in an intellectual and project-based Programme focused on solving real environmental problems relevant to educational institutions and local communities. Project topics included waste management in educational organizations, improving energy efficiency, and developing environmental awareness activities for schoolchildren. Project work was accompanied by reflective discussions and peer assessment, which contributed to the development of analytical and reflective skills.

Data Analysis Technique. Since environmental thinking was conceptualized in the study as an integrative construct, an important task was not only to identify changes in each component but also to analyze the nature of their interrelations. This consideration determined the choice of appropriate statistical data processing methods. Quantitative data analysis was carried out using descriptive statistics and Student's *t*-test. The level of statistical significance was set at $p < 0.05$, which allowed the assessment of the reliability of differences between the results obtained at the diagnostic and control stages of the study.

To achieve a deeper analysis of the relationships between the structural components of environmental thinking, a correlation analysis was conducted. This analysis made it possible to determine the degree of coherence between the cognitive, value-motivational, and behavioral-reflective components and to identify the nature of their mutual influence.

Pearson's correlation coefficient was used for correlation calculations, as the distribution of indicators across the main variables met the criteria of normality. The analysis was performed using data obtained at the control stage of the experiment, which allowed the identification of stable relationships formed during the implementation of the intellectual and project-based Programme. the level of statistical significance was set at $p < 0.05$.

Results. At the diagnostic stage of the study, the initial level of environmental thinking among students of teacher training colleges was determined in order to identify baseline characteristics and existing difficulties in the formation of environmentally responsible attitudes and behavior. The obtained results reflect the state of environmental thinking before the implementation of the intellectual and project-based Programme.

The initial distribution of environmental thinking levels in Table 1 presents the distribution of students according to the identified levels of environmental thinking at the diagnostic stage.

Table 1
Initial distribution of environmental thinking levels (n=158)

Level	Number of students	Percentage (%)
Low	76	48
Medium	58	37
High	24	15

The obtained data indicate that the majority of students were classified at low and medium levels of environmental thinking. Nearly half of the respondents demonstrated a low level, characterized by fragmented ecological knowledge, a weak understanding of cause-and-effect relationships in environmental processes, and a limited ability to apply theoretical knowledge in practical situations. Students at this level typically rely on isolated facts and descriptive judgments when analyzing environmental problems, which hinders the development of reasoned and sustainable solutions.

Students classified at the medium level demonstrated a more stable understanding of basic environmental concepts and, in general, a positive attitude towards environmental protection. However, their environmentally responsible behavior remained situational in nature and largely dependent on external regulation. When confronted with complex or unfamiliar environmental situations, these students experienced difficulties in independently analyzing problems and substantiating their decisions.

Only a relatively small proportion of respondents exhibited characteristics corresponding to a high level of environmental thinking. These students demonstrated systemic thinking, the ability to consider environmental problems from multiple perspectives, and the presence of internalized ecological values. They were more confident in applying knowledge to practice-oriented tasks and in proposing feasible solutions. Nevertheless, the limited number of such students at the initial stage indicates an insufficient level of environmental thinking development among the majority of participants at the beginning of their professional training (Malyashova & Gadelshina, 2025; Dlimbetova, 2020).

Distribution of environmental thinking levels after the implementation of the Programme.

Following the implementation of the intellectual and project-based Programme, repeated diagnostics were conducted at the control stage in order to assess changes in the level of environmental thinking. The results are presented in Table 2.

Table 2
Distribution of environmental thinking levels after the intervention (n=158)

Level	Number of students	Percentage (%)
Low	19	12
Medium	73	46
High	66	42

The data demonstrate substantial changes in the distribution of students across environmental thinking levels. The proportion of students with a low level decreased from 48% to 12%, while the number of students with medium and high levels increased significantly. The most pronounced growth was observed in the high-level group, whose size increased almost threefold after participation in the Programme.

Comparative dynamics of environmental thinking levels. In order to identify the dynamics of changes, a comparative analysis of the results. obtained at the diagnostic and control stages was conducted.

Table 3

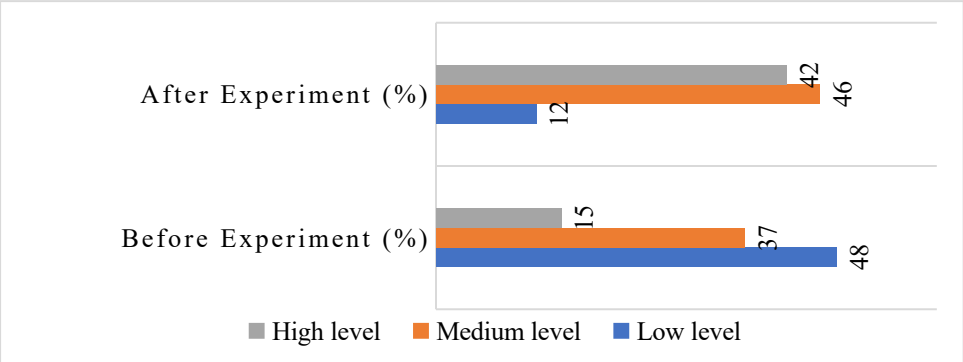
Comparative dynamics of environmental thinking levels (%)

Level	Diagnostic stage	Control stage
Low	48	12
Medium	37	46
High	15	42

The comparative data indicate a clear redistribution of students across environmental thinking levels. The recorded quantitative changes reflect not only an increase in environmental knowledge but also qualitative shifts in approaches to analyzing environmental problems. After the intervention, students more frequently considered environmental issues in a broader context, taking into account social, economic, and educational factors (Babikov & Maladaeva, 2022; Malyashova & Gadelshina, 2025). Their responses became more structured, and their argumentation more logically grounded rather than fragmentary. For a more visual representation of the dynamics of environmental thinking levels, the comparative results are presented in Figure 1.

Figure 1

Dynamics of environmental thinking levels before and after the experiment



The figure illustrates a consistent decrease in the proportion of students with a low level of environmental thinking alongside a simultaneous increase in medium and high levels, which indicates a systemic effect of the implemented Programme.

Changes in structural components of environmental thinking. To clarify the nature of the observed changes, an analysis of shifts in the structural components of environmental thinking was conducted.

Table 4

Changes in structural components of environmental thinking

Component	Diagnostic stage	Control stage
Cognitive	Fragmented knowledge of environmental issues	Systemic understanding of environmental problems
Value-motivational	External motivation, situational attitudes	Internalized ecological values
Behavioral-reflective	Low readiness for action	Stable, environmentally responsible behavior

The results indicate that the most significant changes occurred not only at the cognitive level but also within the value-motivational and behavioral-reflective components. Whereas at the diagnostic stage, environmental thinking was predominantly declarative in nature, after the intervention, a more integrated structure was identified, combining knowledge, values, and behavior.

Correlation analysis of environmental thinking components. An analysis of changes in individual components of environmental thinking does not fully explain the nature of the observed shifts without considering their interdependence. Therefore, at the next stage,

a correlation analysis was conducted to identify the degree of coherence between the cognitive, value-motivational, and behavioral-reflective components.

The results revealed statistically significant positive correlations among all components. A strong positive relationship was identified between the cognitive and value-motivational components ($r=0.62$; $p<0.01$), indicating a close association between the depth of understanding of environmental problems and the formation of stable ecological values. A significant correlation was also found between the cognitive and behavioral-reflective components ($r=0.57$; $p<0.01$), suggesting that well-developed environmental knowledge facilitates the transition from understanding to practical action.

The strongest relationship was observed between the value-motivational and behavioral-reflective components ($r=0.69$; $p<0.01$), which confirms the key role of value orientations in shaping environmentally responsible behavior.

Table 5
Correlations between components of environmental thinking (n=158)

Components	r	p
Cognitive – Value-motivational	0.62	< 0.01
Cognitive – Behavioral-reflective	0.57	< 0.01
Value-motivational – Behavioral-reflective	0.69	< 0.01

The correlation analysis explains the dynamics recorded in Tables 1–3. The growth of the value-motivational component acted as a mediating factor in subsequent changes in students' behavioral practices, which confirms the effectiveness of intellectual and project-based activity as a pedagogical means of developing environmentally responsible behavior among future teachers.

Discussion. The results obtained in this study allow for a deeper interpretation of the mechanisms underlying the development of environmental thinking among students of teacher training colleges. The predominance of low and medium levels of environmental thinking at the diagnostic stage confirms the existence of a well-documented gap between environmental awareness and environmentally responsible behavior, which has been widely discussed in contemporary research on environmental education (Titova, 2022). This finding indicates that, at the initial stage of professional training, students' ecological knowledge and attitudes remain insufficiently integrated into stable behavioral patterns.

The substantial redistribution of students across environmental thinking levels observed after the implementation of the intellectual and project-based Programme suggests that project-oriented learning facilitates qualitative transformations rather than merely increasing the volume of acquired knowledge. Unlike traditional instructional approaches, which often focus on the transmission of factual information, project-based learning creates conditions for engagement with real-world environmental issues. Similar effects have been reported in previous studies emphasizing the role of project-based learning in integrating cognitive, value-based, and behavioral components of education (Smirnova, 2023; Baigunakova et al., 2025).

Of particular importance is the significant increase in the proportion of students demonstrating a high level of environmental thinking. This shift reflects a transition from a situational and externally regulated understanding of environmental issues to more systemic reasoning and stable behavioral orientations. Such a transition is consistent with findings reported in earlier studies on the effectiveness of project-oriented learning in environmental education, which highlight its potential to foster the internalization of ecological values and long-term behavioral change (Mukhametkairov et al., 2025; Urunova et al., 2020).

The observed changes can also be interpreted through the lens of student segmentation according to environmental thinking profiles. The redistribution of students across levels suggests that individuals initially characterized by passive or externally motivated attitudes gradually moved towards profiles defined by responsibility, openness, and social orientation. This transition supports the interpretation of environmental thinking as a dynamic and structurally integrated phenomenon rather than a static set of isolated characteristics.

The correlation analysis further clarifies the mechanisms behind the identified changes. Statistically significant positive relationships between the cognitive, value-motivational, and behavioral-reflective components indicate that these dimensions develop in close interdependence. In particular, the strong correlation between the value-motivational and behavioral-reflective components explains why behavioral changes became especially pronounced after the intervention. As students' ecological values became internalized, they increasingly translated knowledge and attitudes into environmentally responsible actions. This finding confirms the integrative effect of intellectual and project-based activities and explains why improvements were not limited to isolated indicators but affected the overall structure of environmental thinking.

From a practical perspective, the results demonstrate that the structured integration of intellectual and project-based learning into teacher education programmes contributes to the formation of environmentally responsible behavior. Importantly, the findings indicate that such integration is feasible within existing curricula and does not require substantial organizational or structural changes. This makes the proposed approach particularly relevant for teacher training colleges, where curricular flexibility is often limited. The results therefore highlight the potential of project-oriented pedagogical technologies to strengthen environmental education and support sustainable development within the system of vocational teacher education (Balycheva, 2020; Kuzmina & Bibikova, 2022).

Conclusion. This study substantiates the effectiveness of intellectual and project-based activities in developing environmental thinking among teacher training college students. It empirically confirms that integrating practice-oriented projects into pedagogical disciplines leads to measurable positive changes in cognitive, value-motivational, and behavioral-reflective components of environmental thinking.

The research identifies the structural composition of environmental thinking as an integrated construct and demonstrates statistically significant relationships between its components. It establishes that value-motivational factors play a key role in transforming environmental knowledge into environmentally responsible behavior. The scientific contribution of the study lies in providing empirical evidence of the applicability and effectiveness of intellectual project-based learning within secondary vocational pedagogical education and in defining pedagogical conditions that ensure its successful implementation in teacher training colleges.

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Scientific and Methodological Foundations for Training Pedagogical Specialists in the Use of Artificial Intelligence Tools

Abstract

Introduction. This article comprehensively examines the scientific and methodological foundations of training educators to use artificial intelligence (AI) tools. The study aims to identify the need for new competencies among teachers arising from technological modernization in the contemporary education system. *Methodology and methods.* Through a review of international and national literature, as well as survey, observation, and comparative analysis methods, the level of teachers' mastery of AI tools, existing barriers, and professional needs were identified. *Results.* The results indicate that the integration of AI into the educational process in Kazakhstan is at a formative stage and that teachers' professional training requires systematic improvement. *Scientific novelty.* The scientific novelty of the study lies in identifying teachers' emerging AI-related competencies and key barriers to AI integration in the context of Kazakhstan's education system, based on empirical data and methodological analysis, with practical *significance.* The study demonstrates that the effective use of AI enhances teachers' professional competence and improves the quality of education, and it offers methodological recommendations and strategic directions.

Keywords: artificial intelligence, pedagogical competence, digital transformation, AI tools, teacher training, learning process, innovative technologies.

Introduction. The contemporary education system is undergoing a phase of technological transformation, in which artificial intelligence (AI) tools are introducing substantial changes to the teaching and learning process. Educational content delivery and assessment practices, instructional methods, and interaction between teachers and students are increasingly being reconsidered through the integration of AI technologies. Consequently, training educators to effectively use AI tools is no longer merely a technological innovation, but has become a strategic priority aimed at improving the quality of education.

At the international level, extensive research has been conducted in this field. Studies indexed in the Thomson Reuters and Scopus databases have examined the readiness of educators in the United States, Qatar, and European countries to adopt AI tools, their practical implementation, and related methodological needs (Holmes et al., 2019; Knowles et al.,2014). Data obtained

from global studies indicate that incorporating artificial intelligence technologies into education brings double benefits: it not only enhances teachers' professional skills but also positively impacts students' academic achievements (World Economic Forum, 2020).

In Kazakhstan, research efforts have likewise focused on investigating educators' levels of AI proficiency. Within domestic projects, the digital literacy of teachers is analyzed, as well as their perception of AI tools and the challenges they face. Special attention is given to developing strategies for integrating AI into teacher professional development programs. At the same time, practical experience is being collected on the use of AI for teaching specific subjects in schools, which serves as the basis for creating relevant educational and methodological materials (Moldagalieva, 2025; Ministry of Education of the Republic of Kazakhstan, 2023).

Nevertheless, both international and national studies indicate that educators' insufficient readiness to use AI professionally, limited technical competence, and unresolved methodological and ethical issues remain key challenges (Ministry of Education of the Republic of Kazakhstan, 2023; European Commission, 2019).

In this context, the topic "Scientific and Methodological Foundations for Training Educators to Use AI Tools" is particularly relevant. The study aims to identify the relationship between pedagogical practice and methodological recommendations and to demonstrate effective approaches for integrating AI into the teaching and learning process.

The research data were systematized to determine educators' levels of AI proficiency, their opportunities for practical application, and their methodological needs. The combination of research methods employed made it possible to substantiate, from a scientific and methodological perspective, effective approaches to training educators in the use of AI tools.

Based on the issues identified in the introduction, this study addresses the following research questions:

RQ1. What is the current level of educators' use of artificial intelligence (AI) tools in the teaching and learning process, and what barriers and methodological needs do educators face in applying these tools in practice?

RQ2. What scientific and methodological foundations are required for training educators to use AI tools effectively, and how does such training contribute to the development of teachers' professional competence?

These research questions were systematically examined through a review of international and national literature, a survey of educators, and a comparative analysis of foreign and domestic practices. The findings related to RQ1 focus on identifying educators' levels of AI proficiency, frequency of use, and existing challenges, while the analysis addressing RQ2 explores methodological approaches, training models, and strategic directions for integrating AI into the educational process (Rind, 2026; UNESCO, 2019; OECD, 2021).

Materials and Methods. For example, A. Harri's study provides a comprehensive description of the functions of AI within the education system, viewing it as a key instrument for modernizing the teaching process. The author systematizes the main functions of AI in education into four areas: automation of instruction, personalization of learning materials, application of intelligent tutoring systems, and development of learning analytics. A distinctive feature of this work is the presentation of core conceptual models that enable the pedagogical application of AI technologies. Although the study is predominantly theoretical and lacks sufficient empirical validation, it remains valuable for establishing the scientific foundation of AI training methodologies for educators, as AI is conceptualized as a strategic resource for enhancing teachers' professional effectiveness (Harry, 2024; Granströmetal & Oppi, 2025).

According to Google Scholar data, more than 200 academic articles published between 2010 and 2020 on the use of AI in education have been systematically analyzed. The scientific value of this body of work lies in its step-by-step characterization of the development dynamics of AI in education and its clear identification of key directions. The authors categorize AI applications in education into four main areas: intelligent tutoring systems, learning analytics, adaptive learning, and automated assessment. These areas collectively present a comprehensive model for integrating AI technologies into pedagogical practice (Zhai et al., 2021; López-Chila et al., 2023).

The research emphasizes that one of the primary barriers to the effective use of AI tools is educators' insufficient professional training. From this perspective, the article substantiates the scientific rationale for the necessity of training educators in AI. The methodological depth of the study positions it as one of the foundational sources in this research domain.

Results. Turning to the survey results, the diagram illustrates responses from 12 educators to the question: "How frequently do you use AI tools in the teaching process?"

The analysis reveals four response categories:

Never use - 0%

All participating educators reported using AI tools to some extent, indicating that AI technologies have already entered the pedagogical environment.

Rarely (1-2 times per month) - 15.38%

Approximately two respondents reported infrequent use, suggesting lower confidence levels or limited perceived necessity.

Frequently (1-2 times per week) - 38.46%

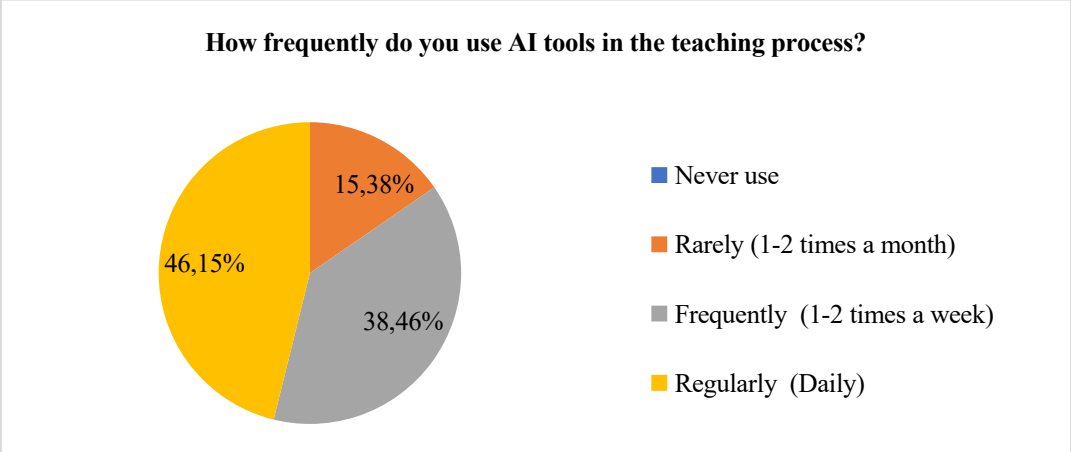
Five educators use AI tools regularly, though not daily, indicating a gradual integration of AI into teaching practice.

Regularly (daily) - 46.15%

Five educators reported daily use, demonstrating that AI tools have become an integral part of lesson preparation, assessment, and instructional material development (Figure 1).

Figure 1

The indicator of the use of artificial intelligence tools in the learning process



Overall, 83.4% of educators reported frequent or daily use of AI tools, reflecting high interest and strong practical demand. While most educators have developed practical AI skills, the 16.7% who use AI infrequently may require targeted methodological support.

The survey aimed to identify the primary purposes for which educators use artificial intelligence (AI) tools in their professional practice. The analysis of data provided by 13 teachers made it possible to identify current trends and patterns in the implementation of artificial intelligence

systems in educational practice. According to the results obtained, the main area of AI use by teachers is the creation of educational materials.

This option was selected by 9 respondents, accounting for 69.2% of the total sample. This finding suggests that educators primarily perceive AI as a supportive tool that facilitates routine instructional tasks, such as preparing lesson materials, generating textual content, and developing methodological resources. The high percentage reflects the practical value of AI in reducing teachers' workload and increasing efficiency in content preparation.

The second most frequently selected purpose is observation, evaluation, and task creation, reported by 8 respondents, 61.5%. This result demonstrates that a substantial number of educators employ AI tools for assessment-related activities, including generating assignments, formulating evaluation criteria, and analyzing students' learning outcomes. The use of AI in this area highlights its potential to support formative and summative assessment processes and enhance objectivity and consistency in evaluation.

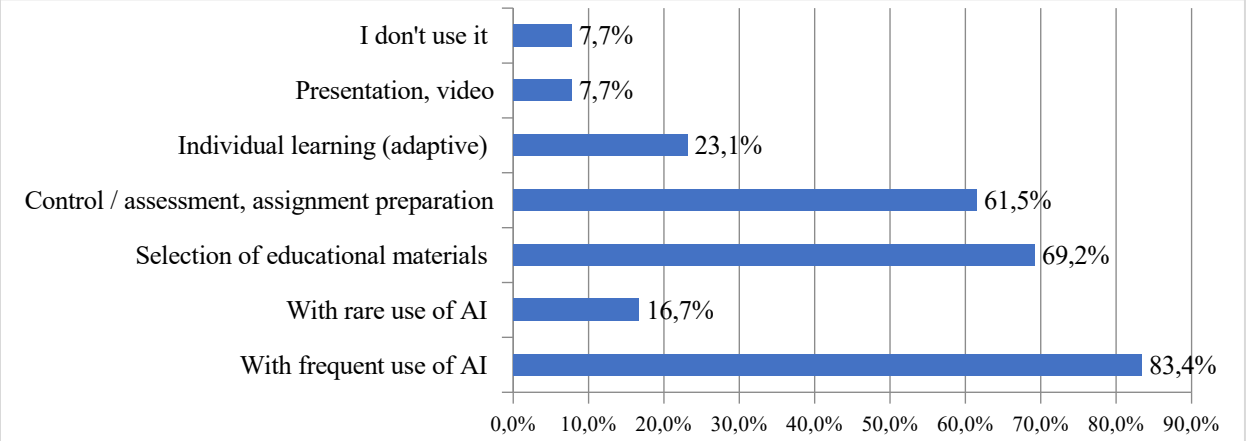
In contrast, the use of AI for individual or adaptive learning remains relatively limited. Only 3 educators 23.1% reported using AI tools to design individualized learning trajectories. This comparatively low figure may indicate insufficient methodological knowledge or limited practical experience in applying AI for personalized instruction. It also suggests that the pedagogical potential of AI in supporting learner-centered and adaptive learning models has not yet been fully realized.

Even lower usage was observed in the area of creating presentations and video materials, with only 1 respondent 7.7% indicating the use of AI for this purpose. This finding may reflect a lack of familiarity with AI-based multimedia tools or a preference for traditional methods of visual content creation. Finally, one respondent 7.7% reported not using AI tools at all. Although this represents a small proportion of the sample, it underscores the existence of disparities in digital competence and readiness among educators, highlighting the need for targeted professional development and institutional support.

Overall, the survey results reveal that educators predominantly use AI tools for auxiliary and productivity-oriented tasks, while more advanced pedagogical applications, such as adaptive learning and creative instructional design, are less common. These findings emphasize the importance of developing a structured scientific and methodological training model that not only enhances technical skills but also fosters pedagogically meaningful and ethically responsible integration of AI into teaching practice. (Figure 2)

Figure 2

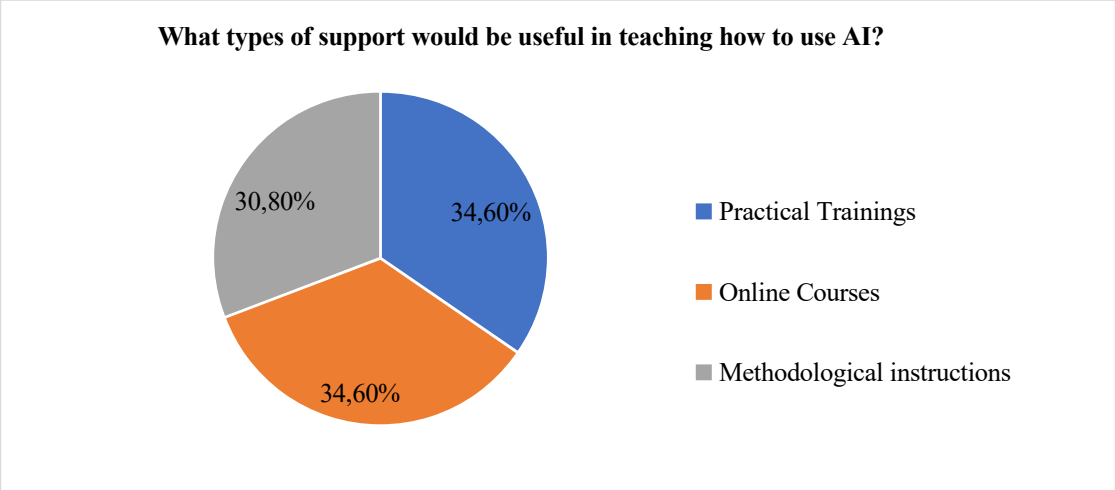
Types of use of artificial intelligence tools in the educational process



Survey respondents identified online courses and practical training, as well as methodological instructions, as the most effective forms of support for learning AI tools, highlighting the importance of hands-on and interactive professional development. (Figure 3).

Figure 3

Types of support for mastering artificial intelligence



The comparative analysis method enabled a systematic comparison of international and national experiences in training educators to use AI tools. This approach focused on identifying similarities and differences in strategic priorities, teacher training models, and mechanisms for integrating AI technologies into education systems.

Discussion. International practices (United States, European countries, Qatar) are based on structured, institutionally established programs for developing educators' AI competencies. In these contexts, teachers' digital and AI competencies are regulated by national standards, and professional development programs mandatorily include AI-related modules. Comprehensive regulatory frameworks, data security policies, and methodological guidelines support AI integration, with training emphasizing practice-oriented cases and subject-specific scenarios.

In contrast, Kazakhstan's experience in integrating AI into pedagogical practice remains at a formative stage. Although programs aimed at enhancing educators' AI competencies exist, they lack standardization and vary by region. The shortage of methodological guidelines, subject-specific cases, and clear instructional algorithms encourages educators to independently explore AI technologies. Furthermore, comprehensive regulations addressing data ethics, academic integrity, and responsible AI use remain insufficient.

The comparative analysis revealed several commonalities:

1. Both contexts recognize the importance of enhancing educators' AI competencies;
2. AI is viewed as a tool for personalization, automation, and assessment improvement;
3. Professional development programs serve as the primary mechanism for teacher training.

Key differences were also identified. International practices are institutionally structured with well-established regulatory and methodological frameworks, whereas Kazakhstan's experience is still in a testing and development phase. While subject-specific AI methodologies are widely disseminated abroad, Kazakhstan lacks sufficient scientific and methodological resources in this area.

Thus, the comparative analysis highlights best international practices while identifying areas requiring improvement within the national education system. This provides a scientific basis for developing effective methodological recommendations aimed at enhancing educators' professional competence.

The main discussion points include:

1. The need to improve AI training systems through modular and adaptive programs;
2. The shortage of methodological guidelines and subject-specific instructional scenarios;
3. The importance of ethical and legal considerations, including data protection and academic integrity;
4. The impact of AI on the teacher's role, with findings indicating that AI does not replace teachers but enhances their methodological, creative, and analytical functions.

The study demonstrates that the scientific and methodological foundations of training educators to use AI tools constitute a key component of digital transformation in education. Effective AI integration enhances teachers' professional competence and improves instructional quality.

Key recommendations include:

1. Developing multi-level AI training programs for educators;
2. Creating methodological guidelines, subject-specific cases, and practical manuals;
3. Improving AI-related infrastructure in schools;
4. Implementing ethical regulations and guidelines for responsible AI use;
5. Integrating AI modules into continuous professional development systems.

In conclusion, training educators to use AI tools is a strategic imperative for improving educational quality and a key requirement of modern education. Educators' mastery of AI tools represents a crucial component of digital transformation, and scientifically grounded methodological training can elevate teaching effectiveness to a new level.

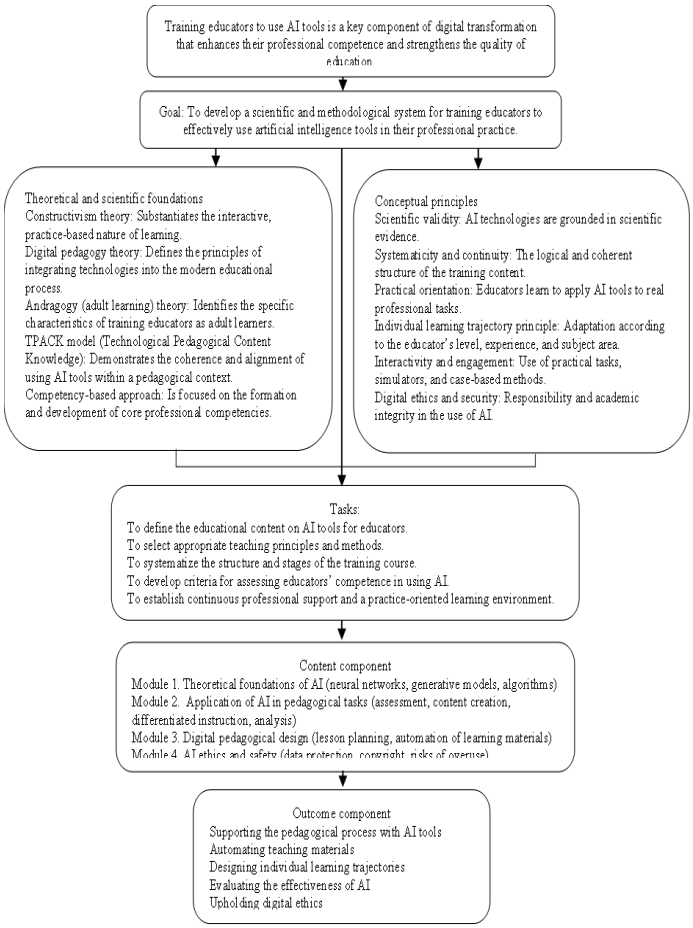
The conclusions drawn from the analyzed sources and the results of the conducted survey highlight the importance of developing a scientific and methodological model aimed at integrating artificial intelligence (AI) into educational practice in a pedagogically meaningful and ethically responsible manner. The proposed scientific and methodological model demonstrates significant potential for the effective integration of artificial intelligence (AI) tools into educational practice. One of the key strengths of the model lies in its systemic structure, which ensures consistency between theoretical foundations, methodological principles, content components, and expected learning outcomes. This structural coherence enables the model to function as a comprehensive framework for professional development rather than as a set of fragmented training activities.

The model provides opportunities for the gradual and sustainable development of educators' professional competencies by combining theoretical knowledge with practical application. Through its modular content design, the model allows flexibility and adaptability to educators' professional needs, subject areas, and levels of digital readiness. This adaptability enhances the scalability of the model and supports its implementation in diverse educational contexts.

Another important capability of the model is its focus on pedagogically meaningful AI use. By emphasizing instructional design, assessment, adaptive learning, and learning analytics, the model promotes the use of AI not merely as a technical tool but as an integral component of the teaching and learning process. This approach contributes to improving instructional quality, increasing learner engagement, and supporting differentiated instruction (Figure 4).

Figure 4

A Scientific and Methodological Model for Training Educators to Use Artificial Intelligence Tools



The proposed scientific and methodological model for training educators to use artificial intelligence (AI) tools demonstrates a structured and systematic approach to enhancing teachers' professional competence within the context of digital transformation in education. The model is built on a clear logical sequence, progressing from theoretical foundations to practical outcomes, which ensures its internal coherence and applicability in real educational settings.

At the conceptual level, the model emphasizes that training educators to use AI tools is a key driver of digital transformation that directly influences both professional competence and the quality of education. This overarching premise is aligned with contemporary international research, which highlights AI as an enabling technology rather than a substitute for pedagogical expertise. The stated goal to develop a scientific and methodological system for effective AI use in educators' professional practice clearly positions the model within the competence-based and practice-oriented paradigms of modern education.

The model's outcomes are strongly grounded in established educational theories, including constructivism, digital pedagogy, and andragogy. Constructivist theory ensures that learning is interactive and practice-based, enabling educators to actively construct knowledge through engagement with AI tools. Andragogical principles acknowledge educators as adult learners, emphasizing autonomy, relevance, and experiential learning. The integration of the TPACK (Alkubaisi, 2025; Mishra & Koehler, 2006) framework further strengthens the model by ensuring a balanced alignment between technological, pedagogical, and content knowledge. As a result, the model supports not only technical skill acquisition but also

pedagogically meaningful AI integration. The competence-based approach reinforces the outcome orientation of the model by focusing on the development of core professional competencies rather than isolated technical skills.

The conceptual principles embedded in the model, scientific validity, systematicity, practical orientation, individual learning trajectories, interactivity, and digital ethics, play a decisive role in shaping the expected outcomes. Scientific validity ensures that AI tools are selected and applied based on evidence-based practices. Systematicity and continuity contribute to the sustainability of learning outcomes by supporting gradual competence development. Practical orientation and interactivity promote the transfer of learning into real teaching scenarios, increasing the likelihood of long-term adoption of AI tools. Importantly, the inclusion of digital ethics and security as a core principle reflects global academic discourse on responsible AI use and strengthens the model's relevance in contemporary educational contexts.

The clearly defined tasks of the model function as operational mechanisms that translate theoretical principles into measurable results. By systematizing course structure, defining assessment criteria, and establishing continuous professional support, the model ensures that learning outcomes are both assessable and sustainable. The modular content structure further enhances effectiveness by allowing flexibility and adaptability to educators' diverse professional contexts.

The four content modules collectively address the full spectrum of AI integration in education. Theoretical foundations provide conceptual understanding, while applied modules focus on assessment, content creation, differentiated instruction, and learning analytics. Digital pedagogical design supports automation and instructional efficiency, and the ethics and safety module ensures responsible and legally compliant AI use. This comprehensive coverage enables educators to move from conceptual awareness to confident and ethical application of AI tools.

The outcome component of the model represents its most significant contribution. As a result of participating in the proposed training system, educators are expected to acquire a set of integrated competencies, including the ability to support pedagogical processes using AI tools, automate instructional materials, design individualized learning trajectories, evaluate the effectiveness of AI applications, and uphold principles of digital ethics.

These outcomes indicate that the model does not merely enhance technical proficiency but fundamentally transforms the educator's professional role. AI is positioned as a tool that strengthens teachers' analytical, methodological, and creative capacities rather than replacing them.

Conclusions. The conducted study clearly demonstrated the relevance of training educators to use artificial intelligence (AI) tools in the context of the digital transformation of the education system. Analysis of international and domestic scientific sources, as well as the results of a survey conducted among teachers, confirmed that the process of integrating AI into educational practice requires systematic scientific and methodological organization. The study results showed that most educators actively use artificial intelligence technologies in their professional activities. These tools are applied to create educational content, develop learning tasks, and optimize organizational aspects of the educational process. This indicates that teachers are ready for digital transformation and perceive AI as a tool that enhances the effectiveness of their professional activities. However, the insufficient methodological guidelines, the absence of specific subject-oriented algorithms for using AI, as well as unresolved ethical and legal issues, were identified as the main factors hindering teachers from professionally applying AI.

To address these issues, a scientific and methodological model for training educators to use AI tools was developed, based on the

principles of theoretical grounding, systematic approach, practical orientation, and ethical responsibility. The structure of the model includes objectives, theoretical and scientific foundations, conceptual principles, tasks, content, and result-oriented components, with ensured logical interconnections among them. The result-oriented component of the model is aimed at comprehensively enhancing teachers' professional competencies. Specifically, teachers acquire skills in effectively using AI tools to support the learning process, automating educational materials, designing personalized learning trajectories, evaluating the effectiveness of AI applications, and adhering to the principles of digital ethics. This demonstrates that AI does not replace the teacher but rather strengthens their methodological, analytical, and creative potential. Thus, the study results and the proposed scientific and methodological model establish a scientific basis for meaningful pedagogical and ethically responsible integration of AI into educational practice. This model, as a tool for the regular updating of teachers' knowledge and skills, paves the way for improving the quality of education and provides teachers with the necessary skills to work in the digital world.

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Students' Interpersonal Communication in a Multicultural Environment

Abstract

Introduction. The study addresses the problem of improving the characteristics of students' interpersonal communication in the context of a multicultural university environment in Kazakhstan. Interpersonal communication constitutes a crucial factor in the formation of students' social adaptation, academic engagement, and intercultural competence. Within a multicultural setting, effective communication functions as an essential condition for the development of tolerance, mutual respect, and the integration of diverse cultural and ethnic groups. Nevertheless, challenges including language barriers, differences in communication styles, and intercultural misunderstandings may hinder the effectiveness of the communicative process. *Methodology and Methods.* The research employed a descriptive research design and survey methodology. The study involved 124 first and second year undergraduate students majoring in Pedagogy and Psychology and Social Pedagogy at a national university in Kazakhstan. The questionnaire was developed on the basis of a process model of intercultural competence proposed in prior scholarly literature and was administered through Google Forms. Descriptive statistical methods were applied for the analysis of the collected data. *Results.* The findings reveal that the majority of respondents demonstrate readiness for intercultural interaction and express a tolerant attitude toward cultural diversity. Students perceive the multicultural environment of the university as a valuable factor in the development of interpersonal and communication skills. At the same time, the study identified persistent challenges, including linguistic difficulties, differing communication norms, and occasional misunderstandings between representatives of different cultural groups. These challenges underscore the need for targeted institutional strategies to strengthen intercultural dialogue. *Scientific novelty.* The study provides new empirical evidence on the specific features of students' interpersonal communication in the multicultural university environment of Kazakhstan**.** Unlike previous research, which often emphasized general intercultural education, this study highlights the interplay between communication skills, intercultural tolerance, and academic success in a diverse university context, with practical significance. *Practical significance.* The research findings can be applied to the development of intercultural training programs, collaborative learning projects, and multicultural events aimed at promoting inclusiveness in higher education institutions. By implementing such measures, universities can foster a more supportive and cohesive learning environment, contributing to the formation of socially competent and globally minded graduates.

Keywords: multicultural environment, interpersonal communication, intercultural competence, tolerance, higher education.

Introduction. In the context of globalization, issues of cultural diversity and interpersonal communication within multicultural environments have become increasingly relevant. In educational settings where representatives of various ethnicities,

religions, and cultures coexist, the interpersonal relationships of students are considered an important social and pedagogical phenomenon. This is due to the fact that students represent one of the most mobile and adaptable segments of society. Interpersonal communication in a multicultural environment is not limited to everyday interactions - it is a complex process involving the interplay of cultural, social, and psychological factors. Each student brings their own cultural background into the communication process, which can both enrich and complicate interpersonal interactions.

Research indicates that intercultural communication skills enhance students' professional competence and contribute to their competitiveness in the future labor market. However, multicultural environments also present challenges such as language barriers, cultural differences, stereotypes, and social distance. The growing academic mobility, the expansion of international partnerships between universities, and the influx of foreign students to Kazakhstan have intensified the need to understand and improve interpersonal communication in multicultural educational contexts. The ability to navigate cultural diversity is now considered an essential skill for future professionals, making this topic not only socially but also economically significant. At the same time, the persistence of communication difficulties and intercultural misunderstandings indicates a gap between the potential benefits of multicultural environments and the experience of students. This study aims to identify the characteristics of students' interpersonal communication in a multicultural environment, with a focus on both facilitating factors and existing barriers.

Contemporary research highlights that universities play a crucial role in shaping respectful, tolerant, and culturally sensitive relationships among students in multicultural environments. Intercultural competence is now recognized as an essential learning outcome that enables students to function effectively within culturally diverse academic settings (Deardorff, 2006). This is particularly relevant for Kazakhstan, where cultural diversity and academic mobility are increasing, strengthening the need for institutions to develop students' abilities to interact constructively across cultural boundaries.

Scholars emphasize that communication styles, values, and interpersonal expectations are shaped by cultural contexts and prior social experiences. Bennett (2004) argues that awareness of cultural differences is a fundamental condition for establishing constructive intercultural dialogue. Within the Kazakhstani context, recognizing not only ethnic diversity but also regional cultural variations contributes to reducing misinterpretations and strengthening mutual respect among students. Gudykunst (2004) notes that intercultural communication becomes more effective when individuals interpret messages through culturally informed perspectives and adapt their communicative behavior accordingly.

Modern universities are increasingly viewed not only as institutions delivering academic knowledge but also as complex social environments where intercultural cooperation and understanding are cultivated. Volet and Ang (2012) emphasize that culturally mixed student groups foster daily intercultural engagement and create conditions for developing communication strategies transferable beyond the university setting. Similarly, Shahjahan et al., (2024) describe the university as a "micro-society" in which students negotiate norms, values, and interaction patterns necessary for participation in diverse communities.

Interpersonal communication in multicultural academic settings includes both verbal and non-verbal dimensions shaped by participants' cultural backgrounds. Gudykunst (2004) stresses that effective intercultural interaction requires individuals to recognize cultural differences and adjust their communicative behavior accordingly. Such adaptability is particularly important for students preparing for professional careers in

international and multicultural contexts. In Kazakhstan, where classrooms frequently include students from diverse ethnic and regional backgrounds, higher education institutions provide a natural platform for developing intercultural communication skills, although structured institutional support remains essential.

The importance of intercultural competence in education is further emphasized by Deardorff (2006), who identifies it as a key outcome for navigating complex cultural environments. Integrating intercultural training into university curricula helps bridge the gap between academic knowledge and practical communication skills required in real-world contexts. Ting-Toomey & Dorjee (2018) demonstrate that expectations regarding communication styles, interaction norms, and conflict resolution differ significantly across cultures. For instance, Tanaka (2025) distinguishes between high-context cultures, where communication relies heavily on implicit cues and non-verbal signals, and low-context cultures, where interaction is more explicit and direct. When students from such backgrounds interact within the same group, misunderstandings may arise without timely mediation. Therefore, educators' awareness of cultural communication patterns is essential for guiding students toward mutual understanding.

If cultural and communicative differences are ignored, even minor misunderstandings may escalate into interpersonal tensions. Bennett (2004) stresses that educators must possess intercultural awareness and mediation skills to maintain constructive learning environments in culturally diverse classrooms. Consequently, teacher training programs should incorporate modules on cultural sensitivity, conflict resolution, and adaptive communication strategies.

Although multicultural academic settings enrich learning experiences and promote personal development, students may still encounter challenges in establishing meaningful interpersonal relationships. Pettigrew and Tropp (2006) demonstrate through meta-analysis that stereotypes, implicit biases, and limited positive intergroup contact can undermine trust and mutual understanding. These barriers may manifest subtly in exclusionary or avoidance behaviors and therefore require deliberate institutional strategies.

Research by Hurtado and Carter (1997) shows that students who perceive campus climates as non-inclusive are more likely to withdraw socially and less inclined to engage with peers from different cultural backgrounds. This finding underscores the importance of institutional climate: diversity initiatives are unlikely to succeed unless inclusivity is embedded in everyday academic and social practices. Communication challenges may also be intensified by language barriers. Oliver & Jorre de St Jorre (2018) note that students facing unfamiliar linguistic and academic expectations may struggle to articulate their ideas and fully participate in classroom discussions. Similarly, Meyerhuber (2019) highlights that listening comprehension difficulties shaped by linguistic and cultural differences can hinder accurate interpretation of peers' viewpoints.

In Kazakhstan's trilingual educational environment, these challenges may be addressed through targeted language support programs and structured initiatives designed for multicultural cohorts. Research indicates that cooperative learning tasks promote collaborative engagement by encouraging equal participation and shared responsibility among culturally diverse students. Gillies (2006) confirms that well-designed group activities improve interaction quality and help transform cultural diversity into an educational advantage.

In addition to curriculum design, intercultural training enhances students' ability to understand one another and communicate effectively across cultural boundaries. Bennett (2004) highlights that such training fosters empathy, active listening, and respectful engagement with cultural differences. These initiatives may

include workshops, guided reflection sessions, and master classes focused on intercultural awareness. Peer mentoring programs that pair students from diverse cultural backgrounds also promote reciprocal support and meaningful interaction. Importantly, such efforts should be continuous rather than episodic to ensure that intercultural competence becomes an integral part of the student learning experience.

Interpersonal relationships in multicultural academic settings are inherently complex, shaped by language differences, cultural expectations, and social inequalities. Nevertheless, coordinated strategies-including intercultural competence development, cooperative learning design, and supportive institutional policies-can significantly enhance the quality of student interactions. Gillies (2006) demonstrates that collaborative learning structures provide balanced participation opportunities, while Hurtado and Carter (1997) emphasize the necessity of cultivating an inclusive institutional climate to sustain meaningful cross-cultural engagement.

Overall, the theoretical perspectives and empirical findings reviewed in this section provide a solid foundation for practical interventions aimed at strengthening interpersonal communication in higher education. Their adaptation within Kazakhstan's multicultural academic context can contribute to the development of inclusive learning environments and prepare students for active participation in a globally interconnected world.

This study aimed to identify the characteristics of students' interpersonal communication in a multicultural academic environment.

Materials and Methods. A descriptive research design was employed to systematically examine participants' experiences, perceptions, and attitudes toward intercultural interaction.

Data Collection Tool. The study utilized a survey methodology as the primary data collection method. The questionnaire was developed and administered via the Google Forms platform.

Participants. The participants were 1st- and 2nd-year undergraduate students majoring in Pedagogy and Psychology and Social Pedagogy at L.N. Gumilyov Eurasian National University. A total of 124 students voluntarily participated in the survey.

The structure and content of the questionnaire were informed by Deardorff's (2006) Process Model of Intercultural Competence, which conceptualizes intercultural competence as a combination of attitudes (respect, openness), knowledge, skills, and internal outcomes such as adaptability and effective communication. Based on this framework, the questionnaire included items designed to assess: students' readiness for intercultural communication; their experience of interacting with representatives of different ethnic groups; encounters with language barriers; levels of tolerance toward cultural differences; and experiences of intercultural misunderstandings or conflicts.

Data Analysis Technique. The questionnaire consisted of closed-ended questions, and the data were analyzed using descriptive statistical methods, including frequency distribution and percentage calculation.

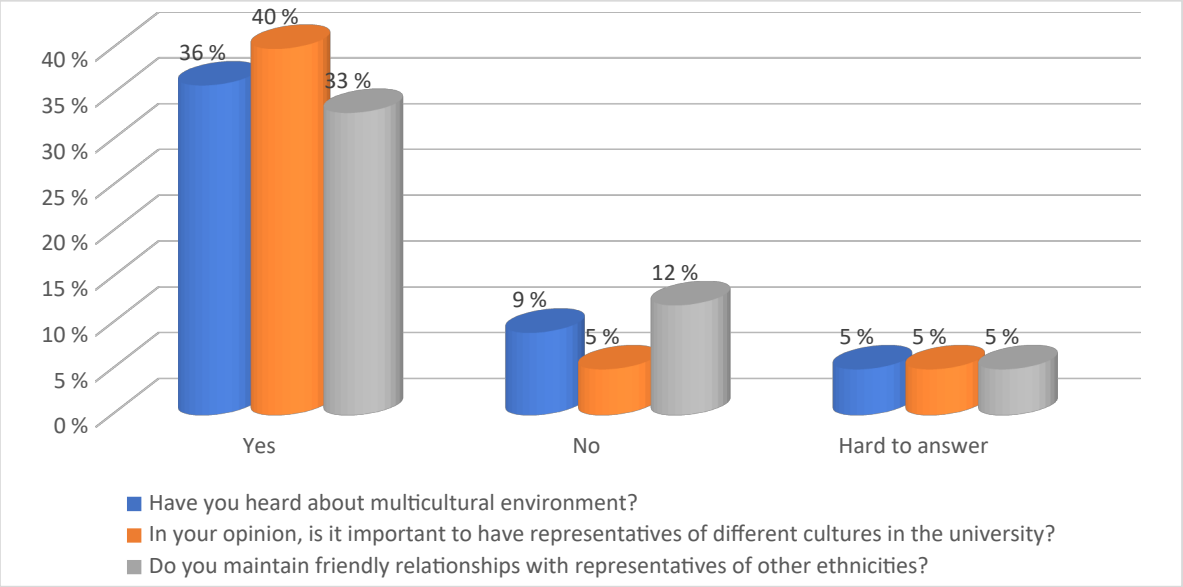
Ethics. Participation was voluntary and anonymous. No personal identifying information was collected. The study was conducted in accordance with the principles of confidentiality and informed consent.

Results. A total of 124 students participated in the survey. 67% of respondents indicated that they are ready for intercultural communication. 53% reported having experience interacting with representatives of different ethnic groups. 44% stated that they often encounter language barriers during the learning process or in daily life. Additionally, 72% expressed a tolerant attitude toward cultural differences. 25% reported having faced at least one intercultural conflict. Finally, 81% noted that studying in a multicultural environment has had a positive impact on their interpersonal communication

skills. This table illustrates students' adaptation to the multicultural environment and their readiness for intercultural communication. The results indicate that the majority of students show tolerance, maintain friendly relationships with peers from other ethnicities, and perceive studying in a multicultural context as beneficial for their interpersonal skills (Figure 1).

Figure 1

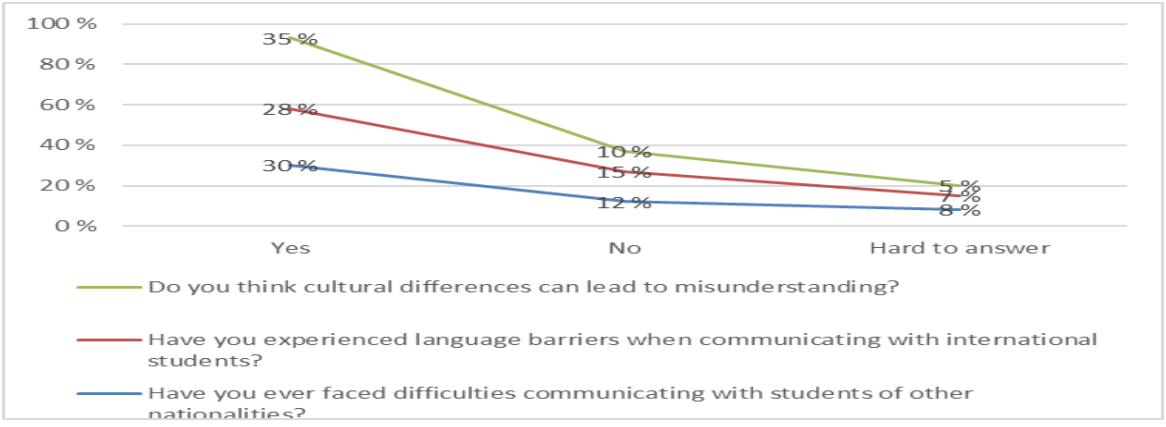
Results of comparative analysis



The majority of students (36%–40%) are aware of the multicultural environment and maintain friendly relationships with peers of different ethnic backgrounds. Additionally, 40% believe it is important to have representatives of different cultures at the university, indicating a generally positive attitude toward multiculturalism. This table presents students' views on communication challenges caused by cultural differences and language barriers. The findings highlight that misunderstandings and linguistic difficulties remain relevant concerns in intercultural contexts (Figure 2).

Figure 2

Results of comparative analysis

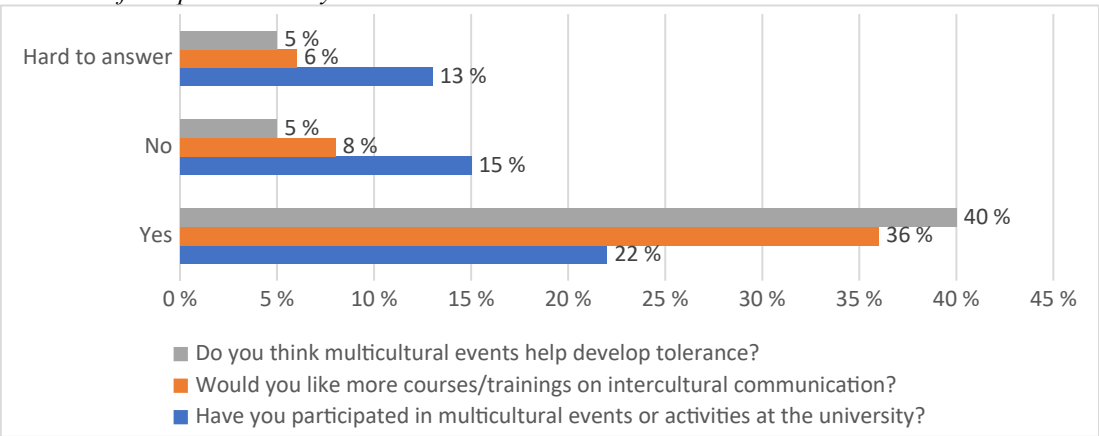


According to the survey results, 35% of respondents believe that cultural differences may lead to misunderstandings. 28% have experienced language barriers when

interacting with international students. These findings highlight the importance of addressing language and cultural challenges in multicultural academic environments. This table describes the extent of students' participation in multicultural university events and their perceptions of these events' impact on the development of tolerance. It also reflects students' interest in additional training on intercultural communication (Figure 3).

Figure 3

Results of comparative analysis



The survey results show that 40% of respondents believe that multicultural events help foster tolerance. Furthermore, 36% expressed interest in additional training on intercultural communication. These results reflect strong student interest in developing intercultural competencies and participating in inclusive university initiatives.

Discussion. Comparison of the study results with established international research indicates that students demonstrate a substantial ability to form interpersonal relationships within multicultural academic settings. This finding corresponds with Bennett's (2004) argument that intercultural sensitivity strengthens constructive interaction across cultural boundaries and with Deardorff's (2006) conceptualization of intercultural competence as a foundation for effective communication in diverse environments. Gudykunst (2004) similarly emphasized that awareness of cultural variation enhances communicative effectiveness and reduces uncertainty in intercultural encounters.

Differences in communication norms also help explain the challenges reported by students. Hofstede (2011) noted that cultural frameworks shape expectations regarding directness, implicitness, and communicative behavior. In the present study, frequent experiences of misunderstanding and linguistic difficulty suggest that unrecognized cultural differences may impede interaction. This finding aligns with Hurtado and Carter's (1997) research, which demonstrated that low perceptions of institutional inclusiveness are associated with reduced engagement with culturally different peers. In our data, 25% of students reported instances of intercultural conflict, further supporting this interpretation.

The role of stereotypes and prejudice in hindering effective communication also appears significant. Pettigrew and Tropp (2006) demonstrated that negative preconceptions reduce trust and create social distance between groups, a pattern reflected in students' reports of strained interactions and discomfort in culturally mixed groups. Although overall tolerance levels were relatively high-67% of respondents reported readiness for intercultural communication, and 72% expressed positive attitudes toward cultural differences, latent tension and bias remained observable.

Language barriers represent another persistent challenge. A considerable proportion of students (44%) indicated that

linguistic difficulties limited their participation, while 35% believed that culturally rooted communication styles easily produce misunderstandings. These findings align with Meyerhuber's (2019) argument that listening and interpretation are culturally influenced processes that, when mismatched, may lead to communicative breakdown.

Despite these challenges, the study also reveals opportunities for improvement. Students expressed interest in additional intercultural communication training (36%), and many respondents (40%) noted that multicultural events foster tolerance and mutual understanding. These preferences correspond with Gillies' (2006) findings that cooperative learning activities enhance group cohesion, mutual trust, and openness to diverse perspectives. Bennett (2004) likewise supports sustained intercultural training as a mechanism for reducing bias and strengthening communication competence.

Overall, the results of this study confirm earlier international research (Bennett, 2004; Deardorff, 2006; Gudykunst, 2004; Pettigrew & Tropp, 2006) while offering context-specific insights into multicultural interaction within Kazakhstani higher education. As globalization and academic mobility continue to increase cultural diversity in universities, the findings highlight both the strengths and persistent challenges in fostering genuinely inclusive and effective intercultural communication in academic environments.

Conclusion. This study investigated the key features of students' interpersonal communication within the multicultural university context of Kazakhstan. The findings indicate that most students demonstrate substantial readiness for intercultural engagement, show tolerant attitudes toward cultural differences, and recognize the academic, social, and personal advantages of studying in culturally diverse environments. These outcomes suggest that higher education institutions in Kazakhstan generally succeed in creating conditions that support the development of intercultural competence and constructive interpersonal relationships.

At the same time, several challenges were identified that may limit the full potential of multicultural learning. Students continue to encounter linguistic difficulties that affect both comprehension and self-expression; cultural mismatches in communication styles that lead to misunderstandings; and instances of intercultural conflict that, while not widespread, remain significant enough to influence perceptions of inclusiveness. These challenges highlight the importance of systematic institutional strategies aimed at supporting intercultural communication in a consistent and structured manner.

Based on the study's results, several recommendations can be proposed to strengthen universities' capacity to function as inclusive and culturally responsive learning communities:

- Integrate ongoing intercultural communication training into the curriculum, with a focus on empathy, active listening, cultural awareness, and conflict-resolution skills. Such training should be continuous rather than delivered as isolated sessions.
- Expand opportunities for cooperative learning and peer mentoring between students from diverse cultural and ethnic backgrounds. These formats help turn cultural diversity into a resource for shared problem-solving and collaborative knowledge creation.
- Implement regular multicultural programs and events that promote inclusiveness, celebrate diversity, and reduce social distance among student groups. These initiatives should be participatory, enabling students to take active roles in their design and execution.

If consistently applied, these measures can contribute to building a more inclusive, collaborative, and culturally aware university environment. In such a context, students not only improve their interpersonal communication skills but also acquire competencies essential for successful participation in diverse social and professional settings within an increasingly globalized world. Looking forward, future research would benefit from longitudinal studies exploring how students' intercultural

communication competencies evolve, especially in response to structured training programs. Comparative studies involving domestic and international students could yield deeper insights into how multicultural experiences shape communicative behavior in different educational settings. Such research would inform evidence-based policies and pedagogical practices aimed at preparing globally competent graduates.

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