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THE SIGNIFICANCE AND POTENTIAL OF THE "TEACHER'S PORTFOLIO" CONCEPT IN ENHANCING THE SYSTEM OF EDUCATORS' CONTINUOUS PROFESSIONAL DEVELOPMENT

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Abstract. *This article examines the theoretical foundations and practical significance of the "Teacher's Portfolio" concept as an innovative tool for enhancing the system of educators' continuous professional development. In the context of modern educational reforms and increasing demands for teacher competence, continuous professional growth has become a strategic priority. The study analyzes the structural components, functional characteristics, and developmental potential of the Teacher's Portfolio as a mechanism for self-assessment, reflective practice, competency monitoring, and professional advancement. Particular attention is given to the portfolio's role in fostering pedagogical autonomy, strengthening professional responsibility, and supporting individualized development trajectories. The research highlights the portfolio's capacity to integrate formal, non-formal, and informal learning outcomes within a unified professional framework. Based on a systematic and competency-based approach, the article substantiates the effectiveness of the Teacher's Portfolio in ensuring sustainability, transparency, and quality in professional development processes. The findings suggest that the implementation of this concept contributes to the modernization of teacher development systems and enhances overall educational quality.*

Keywords: *continuous professional development, teacher's portfolio, professional competence, pedagogical innovation, reflective practice, competency-based approach, professional self-assessment, teacher professional growth, educational quality, lifelong learning.*

Introduction. In the context of rapid socio-economic transformation and globalization, education systems worldwide are undergoing profound reforms aimed at improving quality, efficiency, and competitiveness. In Uzbekistan, large-scale educational reforms, the modernization of national curricula, and the transition toward a competency-based approach to teaching have significantly increased the demands placed on teachers' professional competence and pedagogical mastery. These changes highlight the necessity of establishing a systematic and sustainable model for educators' continuous professional development (CPD).

The Concept for the Development of the Public Education System of the Republic of Uzbekistan until 2030 identifies strategic priorities such as the qualitative renewal of the content of continuous education, the improvement of teacher training and retraining systems, the enhancement of teaching methodologies, the gradual implementation of individualized learning principles, and the integration of modern information and communication technologies into

educational practice. Furthermore, the reform agenda emphasizes increasing the social status, motivation, and professional attractiveness of teaching through improved remuneration and social protection mechanisms. The effective implementation of these objectives requires innovative tools and models capable of supporting teachers' lifelong professional growth [2].

In contemporary pedagogical theory and practice, professional development is increasingly viewed not as a one-time activity but as a dynamic, reflective, and competency-oriented process. Within this framework, the "Teacher's Portfolio" concept emerges as a promising mechanism for structuring, documenting, assessing, and enhancing teachers' professional competencies. The portfolio serves not only as a repository of professional achievements but also as a reflective instrument that promotes self-assessment, professional autonomy, and individualized development trajectories.

Despite the growing recognition of portfolio-based approaches in international educational practice, the scientific substantiation of the "Teacher's Portfolio" concept as a systemic model for continuous professional development within the national educational context remains insufficiently explored. Therefore, there is a need for a comprehensive theoretical and practical analysis of its potential, structural components, and mechanisms for effective implementation. This study aims to substantiate the content, significance, and practical opportunities of the "Teacher's Portfolio" concept in enhancing the system of educators' continuous professional development and to determine its role in fostering professional competencies within modern pedagogical activity.

Research Objectives

1. To analyze the theoretical foundations of continuous professional development within pedagogical activity and to determine the conceptual content and structural components of the "Teacher's Portfolio" model.
2. To develop practical recommendations and methodological guidelines for the effective implementation of the "Teacher's Portfolio" concept in educational practice.

Research and Analysis. The modern education system requires teachers not only to possess in-depth subject knowledge but also to effectively deliver instructional content, foster students' independent thinking, cultivate creative competencies, and develop essential life skills. Such demands necessitate the continuous enhancement of teachers' professional competence and the systematic integration of innovative approaches into pedagogical practice. Within this context, continuous professional development is understood as a dynamic, reflective, and competency-oriented process aimed at ensuring sustainable professional growth. The "Teacher's Portfolio" concept serves as a structured mechanism that systematizes teachers' professional achievements, methodological innovations, reflective practices, and competency development trajectories.

From a theoretical perspective, the portfolio approach is grounded in the principles of lifelong learning, competency-based education, reflective pedagogy, and professional self-regulation. Structurally, the Teacher's Portfolio may include components such as professional documentation, instructional materials, records of professional achievements, evidence of innovative practices, self-assessment tools, and individualized development plans.

The analytical review suggests that the implementation of the Teacher's Portfolio contributes to enhancing transparency in professional evaluation, strengthening teachers' reflective culture, and aligning individual professional growth with institutional and national educational priorities. Consequently, the concept represents not merely a documentation tool but a

comprehensive model for organizing and optimizing the system of educators' continuous professional development.

Innovative approaches enable teachers to employ creative methodologies in their professional practice, organize lessons based on modern pedagogical technologies, and engage in continuous self-improvement. Therefore, the application of innovative approaches in enhancing teachers' professional competence is regarded not merely as a contemporary demand, but as one of the most essential conditions for improving the quality of education.

One of the early theoretical studies in this field was conducted by Fraser, Kennedy, Reid, and McKinney, who systematically analyzed the content, forms, and models of Continuous Professional Development (CPD). The authors conceptualized CPD as encompassing formal professional training, informal learning, and reflective processes intrinsically linked to teachers' daily practice. They substantiated that the effectiveness of CPD is directly associated with its relevance to instructional practice [4].

Empirical studies carried out by American scholar Linda Darling-Hammond and researchers at the Learning Policy Institute identified the key characteristics of effective continuous professional development programs. According to their findings, effective CPD should be sustained over time, practice-oriented, collaborative in nature, and inclusive of mentoring and reflective components. Their research provides scientific evidence that high-quality CPD positively influences teachers' pedagogical expertise as well as students' academic achievement outcomes [3].

In the studies conducted by Talafian and colleagues, CPD processes were examined through the lens of the "Community of Practice" approach. According to this perspective, teachers' collaboration, exchange of experience, and collective problem-solving constitute significant sources of professional development. The research findings indicate that collaboration-based CPD models enhance teachers' motivation and pedagogical engagement [8].

In ensuring teachers' continuous professional development, the content and practice-oriented nature of in-service training courses play a crucial role. In their research, Ibragimov A.A. and Fayzullayeva G.Sh. emphasize that theoretical knowledge can be effectively transformed into practical skills through the efficient organization of practical sessions, careful instructional design, and the application of diverse pedagogical methods within professional development programs[5]. According to the authors, such an approach contributes to strengthening teachers' professional competencies.

This perspective is closely connected to the methodological component of the "Teacher's Portfolio" concept, which the systematic collection of practical lesson materials, methodological guidelines, instructional designs, and documented professional experiences. As a result, teachers gain the opportunity to refine their professional practice, effectively apply existing knowledge and skills in real educational settings, and ensure sustained continuous professional growth.

Although the term "Teacher's Portfolio" does not appear in international literature under this exact designation, conceptually equivalent approaches are widely implemented in many developed countries. In international contexts, similar models are commonly referred to as "Teaching Portfolio"[7], "Teacher Toolkit"[9], "Teachers' Professional Toolkit," "Digital Teaching Portfolio," or "e-Portfolio."[6].

At present, many initiatives aimed at teachers' professional development tend to be centralized and theoretically grounded; however, in practice, they may not fully correspond to individual professional needs. From this perspective, creating flexible conditions tailored to each

teacher's needs and interests—while promoting self-directed learning, professional collaboration, and career advancement—has become an urgent priority.

In response to this need, the "Teacher's Portfolio" concept is proposed as a systematic and practice-oriented model. It integrates practical resources, methodological recommendations, innovative approaches, and tools for personal development into a coherent framework designed to facilitate the organization of teachers' professional activities. The concept seeks to support teachers within the school environment, promote internally driven professional growth based on institutional resources, and create an outcome-oriented learning environment tailored to each educator. Thus, the "Teacher's Portfolio" concept serves as an innovative approach to ensuring continuous professional development within the school context. It is presented as a flexible, practice-based resource adaptable to individualized, digital, and traditional formats of implementation.

Innovative Model of Preparation for Instructional Sessions – The "Teacher's Portfolio" Concept

1. General Provisions

The innovative model of preparation for instructional sessions – the "Teacher's Portfolio" Concept (hereinafter referred to as the Concept), implemented at the Samarkand Regional Center for Pedagogical Excellence (hereinafter referred to as the Center), has been developed to ensure the implementation of Resolution No. PQ-231 of the President of the Republic of Uzbekistan dated June 21, 2024, "On Additional Measures to Improve the System of Continuous Professional Development of Employees in Preschool and School Education Organizations."[1].

The Concept is designed to introduce mechanisms for the continuous enhancement of professional knowledge, skills, and competencies of pedagogical and specialist staff, as well as to establish a system of practical methodological support aimed at ensuring professional preparedness in accordance with modern educational requirements and improving the quality of education.

Within this Concept, the following key terms are applied:

- **Teacher's Portfolio** – a collection of practical and methodological resources aimed at enhancing a teacher's professional development, methodological capacity, and effectiveness in lesson preparation;
- **Document File Compilation** – a structured set of essential documents, templates, and forms related to a teacher's professional activity;
- **Methodological Tools** – a set of instructional materials necessary for organizing lessons effectively and applying diverse pedagogical methods and approaches;
- **Personal Development Tools** – instruments designed to support teachers' personal and professional growth, including reflection, self-assessment, and planning activities;
- **Effective Tools** – a collection of visual, didactic, or practical materials that facilitate interdisciplinary integration and may be applied across various subjects;
- **Digital Technologies** – technologies aimed at enhancing teachers' competencies in the use of modern digital tools within the instructional process.

2. Current State of Lesson Preparation and Existing Challenges

At the Center for Pedagogical Excellence, the overall level of teachers' lesson preparation is assessed as average. Most teachers prepare lesson plans in advance; however, the majority follow standardized formats that do not fully align with contemporary educational requirements.

Certain difficulties are observed in clearly defining lesson objectives and aligning them with learners' competencies. In many cases, lesson plans are developed without sufficient consideration of learners' age characteristics, prior knowledge, and individual needs.

Although innovative methodological approaches—such as competency-based, integrative, and differentiated instruction—are occasionally applied, they lack systematic implementation. Consequently, traditional teaching methods (lecture, question-and-answer, and frontal discussion) continue to dominate instructional practice.

Didactic materials, graphic organizers, interactive tasks, and alternative assessment tools are insufficiently utilized during lessons. While multimedia resources (presentations, video materials, digital games) are available, their level of effective integration into instructional practice remains low.

Reflective tools—that is, instruments enabling teachers to analyze, evaluate, and draw conclusions about their instructional activities after each lesson—are insufficiently applied in practice.

3. Objectives and Tasks of the Concept

The following constitute the primary objectives of the innovative model of preparation for instructional sessions – the "Teacher's Portfolio" Concept:

- To enhance the effectiveness of lesson preparation, foster methodological independence, and develop teachers' competencies in utilizing modern educational resources through the promotion of the "Teacher's Portfolio" Concept at the Center;
- To systematize practical and methodological resources necessary for teachers' professional activities and present them in a flexible and user-friendly "portfolio" format;
- To transform this "portfolio" into school practice, thereby fostering effective methodological collaboration, experience exchange, and a culture of professional development among teachers within each educational institution.

Tasks of the "Teacher's Portfolio" Concept:

- To prepare essential documents, templates, and models required for teachers' daily professional activities;
- To provide a structured collection of pedagogical technologies, modern teaching methods, and innovative approaches;
- To develop mini-training modules and exercises aimed at strengthening professional competencies;
- To compile a set of universal instructional tools applicable during lessons;
- To support each teacher in developing their own individualized "portfolio";
- To train teachers in working with portfolio materials, including lesson plans, interactive instructional designs, visual aids, assessment criteria, and personal development plans;
- To design sample portfolio models adapted to various subjects and educational levels;
- To create a flexible model accessible in both digital and printed formats.

4. Structural Framework and Implementation Mechanism

Based on the defined objectives and tasks, the structural framework of the "Teacher's Portfolio" (Figure 1) has been established as follows:

a) Regulatory and Instructional Documentation Section

A collection of essential documents, templates, and standardized forms related to teachers' professional activities:

- Sample lesson plans;
- Templates for annual and monthly planning;
- Analysis and monitoring forms.

b) Methodological Tools Section

A set of instructional materials necessary for the effective organization of lessons and the application of diverse teaching methods and approaches:

- A catalog of teaching methods;
- Samples of game-based, visual, and interactive instructional strategies.

c) Personal Development Section

A collection of tools designed to support teachers' personal and professional growth, including reflection, self-assessment, and planning instruments:

- Exercises aimed at developing professional and transferable skills;
- Reflection instruments and time-management tools.

d) Effective Tools Section

A compilation of visual, didactic, and practical materials supporting interdisciplinary integration and applicable across different subjects:

- Visual materials, educational manipulatives, and real-life objects;
- Collections of everyday items encountered by students, linked to instructional concepts;
- Supplementary methodological booklets explaining the pedagogical application of each material during lessons.

e) Digital Technologies Section

A set of modern digital tools utilized by teachers in instructional practice:

- QR-coded digital versions of all materials developed within the above sections;
- A curated list of online platforms and mobile applications convenient for lesson preparation and classroom use;
- Ready-made templates for Canva, Google Forms, and PowerPoint.

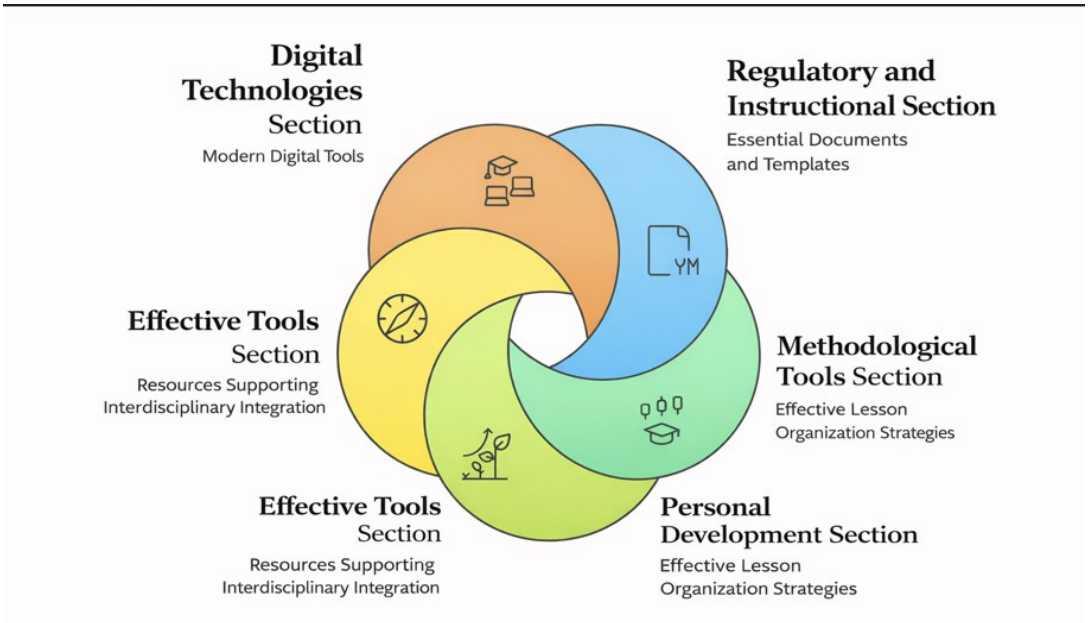


Figure 1. Structural Framework of the "Teacher's Portfolio"

Mechanism for Implementing the "Teacher's Portfolio" in Practice

The effective implementation of the "Teacher's Portfolio" concept is organized based on a phased and systematic mechanism (Figure 2), structured as follows:

Preparatory Stage

At this stage, the content of the Concept is introduced to the Center's staff. It is discussed at Academic Council meetings, and surveys are conducted to identify teachers' professional needs and expectations.

Model Development Stage

The design of the "Portfolio" is developed in alignment with the mission of the Center. The content is selected for each section (methodological tools, personal development, documentation, etc.), ensuring coherence and structural integrity.

Pilot Testing Stage

Two to three initiative teachers conduct master classes demonstrating the use of the Portfolio. Feedback is collected, analyzed, and necessary adjustments are made to improve the model.

Implementation Stage

The Portfolio is officially introduced to all teachers. Methodological support is provided through user guidelines, sample implementation scenarios, and mini-training sessions.

Transfer to School Practice Stage

All theoretical foundations and methodological tools included in the Portfolio are tested, adapted, and institutionalized within real school environments to ensure sustainable application.

Monitoring and Improvement Stage

On a quarterly basis, the level of teachers' utilization of the Portfolio is assessed. The Portfolio is continuously enriched with new methodological tools and interactive resources to maintain its relevance and effectiveness.

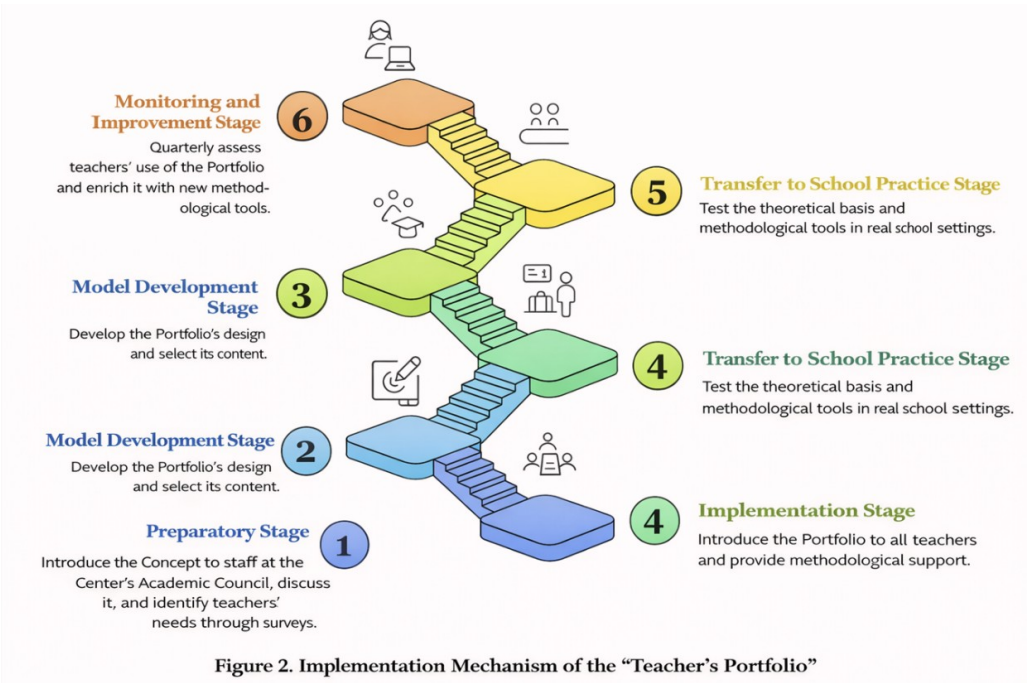


Figure 2. Implementation Mechanism of the "Teacher's Portfolio"

Director of the Center and the Deputy Director for Academic Affairs provide organizational support for the implementation of the Concept. Each head of department is designated as responsible for developing, updating, and facilitating experience exchange related to the respective sections of the Portfolio within their area of specialization.

Each teacher selects materials, methodological recommendations, and instructional tools relevant to their professional needs and personalizes their own "Portfolio." Through this process, teachers independently manage their professional growth, taking into account their individual teaching style and the needs of their learners.

5. Expected Outcomes of the Concept Implementation

Through the fulfillment of the objectives defined within the Concept and the promotion of the "Teacher's Portfolio" at the Samarkand Regional Center for Pedagogical Excellence, the following outcomes are anticipated:

- The systematic use of modern methodological tools, lesson plan templates, differentiated approaches, and interdisciplinary integration methods in teachers' lesson preparation. Through the Portfolio, teachers gain access to a ready-made collection of practical resources for each lesson. As a result, the quality of lesson preparation improves, and the efficiency of resource utilization increases.
- Each teacher develops the ability to analyze their professional practice, identify challenges, and determine an individualized trajectory for professional growth.
- The Portfolio functions not only as an individual resource but also as a practical instrument for collaboration and experience exchange among colleagues. Processes such as "Portfolio Exchange," open lessons, and methodological exhibitions among teachers are intensified.
- Participants in professional development courses become more active, creative, and practice-oriented in their engagement.

By adapting the knowledge and skills acquired at the Center to the school environment, teachers gain the opportunity to implement the "Portfolio" model within their own schools, promote it among colleagues, and integrate it into the institution's internal professional development system. As a result, methodological collaboration among teachers within schools is strengthened.

The "Teacher's Portfolio" gradually becomes an integral component of pedagogical culture.

Results and Conclusion. The study theoretically and practically analyzed the potential of the "Teacher's Portfolio" concept in ensuring continuous professional development within pedagogical activity. Based on the analysis of scientific literature and the generalization of pedagogical experience, it was determined that the Concept enables the systematic integration of methodological, didactic, digital, and reflective resources essential for teachers' professional practice.

The "Teacher's Portfolio" contributes to the development of teachers' professional competencies, enhances the effectiveness of pedagogical activity, and improves the overall quality of education. The professional development process organized within this framework creates conditions for teachers' self-directed learning, reflective practice, and the implementation of innovative approaches in educational practice.

In conclusion, the integration of the "Teacher's Portfolio" concept into the system of professional development and educational practice opens new opportunities for continuous professional growth in pedagogical activity and plays a significant role in preparing competitive teachers who meet the demands of modern education.

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PEDAGOGICAL AND DIDACTIC POTENTIAL OF ARTIFICIAL INTELLIGENCE IN TEACHING MEDICAL CHEMISTRY

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Abstract. *The teaching of medical chemistry requires not only the acquisition of theoretical knowledge but also the development of analytical reasoning and the ability to apply chemical concepts in clinical contexts. This article examines the pedagogical and didactic potential of artificial intelligence (AI) technologies in medical chemistry education. AI-based adaptive learning systems, virtual laboratories, automated assessment tools, and problem-based learning (PBL) approaches are analyzed as effective instruments for enhancing students' academic achievement, clinical-chemical reasoning, and practical competencies. Particular emphasis is placed on issues of data quality, ethical considerations, and the indispensable role of the teacher in AI-supported educational environments.*
Keywords: *artificial intelligence, medical chemistry, adaptive learning, virtual laboratory, problem-based learning, automated assessment.*

Introduction

Medical chemistry is a fundamental discipline within medical education, providing the conceptual framework for clinical biochemistry, pharmacology, pathophysiology, and laboratory diagnostics. It enables future physicians to understand biomolecular structures, chemical reactions in biological systems, and metabolic pathways underlying physiological and pathological processes. Despite its foundational importance, medical chemistry is frequently perceived by students as a challenging and abstract subject. The complexity of molecular mechanisms, reaction kinetics, and interconnected metabolic networks often leads to fragmented understanding and reduced learning motivation. Traditional instructional approaches—primarily lectures and conventional laboratory exercises—are not always sufficient to address individual differences in prior knowledge or learning pace.

Recent advances in artificial intelligence have introduced new opportunities for transforming educational practices. AI technologies allow for advanced visualization of molecular processes, individualized learning trajectories, continuous formative assessment, and integration of theoretical knowledge with clinical scenarios. Consequently, the incorporation of AI into medical chemistry teaching represents a significant pedagogical opportunity and an urgent educational challenge. The aim of this article is to analyze the pedagogical and didactic potential of artificial intelligence in medical chemistry education and to assess its influence on learning outcomes, student engagement, and the evolving role of the teacher.

Materials and Methods

This study is based on a qualitative pedagogical analysis of contemporary scientific literature and educational practice related to the application of artificial intelligence in medical and chemical education. The materials included:

• peer-reviewed journal articles published between 2021 and 2025 addressing AI in medical, biochemical, and chemistry education;

• international and national guidelines concerning ethical and methodological aspects of AI use in healthcare education;

• the author's pedagogical experience in implementing digital and AI-supported tools in medical chemistry courses.

The methodological framework comprised:

• comparative analysis of traditional and AI-supported instructional strategies;

• pedagogical modeling of AI-based teaching methods applicable to medical chemistry;

• synthesis of best practices related to adaptive learning systems, virtual laboratories, automated assessment, and problem-based learning.

The analysis focused on identifying pedagogical benefits, potential limitations, and essential conditions for the effective and responsible integration of AI technologies into medical chemistry education.

Results

The analysis indicates that artificial intelligence substantially expands the didactic potential of medical chemistry instruction.

Enhancement of Conceptual Understanding

AI-based visualization tools, including three-dimensional molecular modeling and interactive animations, enable students to explore protein and enzyme structures, enzyme–substrate interactions, and conformational changes in biomolecules. These tools transform abstract chemical concepts into dynamic and accessible representations, thereby facilitating deeper conceptual understanding and long-term retention of knowledge.

Adaptive Digital Learning

AI-driven adaptive learning systems continuously analyze students' performance, identify knowledge gaps, and adjust instructional content accordingly. In medical chemistry, such systems have demonstrated particular effectiveness in teaching enzyme kinetics, acid–base balance and buffer systems, redox reactions, and metabolic regulation. Personalized feedback and targeted learning activities contribute to increased learning efficiency and student motivation.

AI-Supported Problem-Based Learning

Problem-based learning environments enhanced by AI enable students to engage with authentic clinical and biochemical problems, such as metabolic disorders and enzymatic deficiencies. This approach fosters critical thinking, interdisciplinary integration, and the application of theoretical chemical knowledge to clinical decision-making.

Virtual Laboratories and Simulation

AI-based virtual laboratories provide a safe and cost-effective environment for conducting chemical experiments. Students are able to repeat procedures, explore different experimental conditions, and analyze outcomes without the risks associated with physical laboratories or limitations in material resources.

Automated Assessment

Automated assessment systems supported by AI offer objective and continuous evaluation of students' knowledge and skills. The analysis of learning analytics allows instructors to monitor progress, identify common difficulties, and implement targeted pedagogical interventions.

Discussion

The findings of this study confirm that artificial intelligence addresses several persistent challenges in medical chemistry education, including the abstract nature of content, heterogeneity of student preparedness, and limited opportunities for individualized instruction. At the same time, the integration of AI technologies raises important methodological and ethical considerations. The effectiveness of AI-based systems depends on the quality, validity, and representativeness of the data used for training algorithms. Issues related to data privacy, transparency, and algorithmic bias must be carefully managed within established ethical frameworks. Furthermore, the successful implementation of AI requires adequate technological infrastructure and continuous professional development of teaching staff.

Crucially, artificial intelligence should not be perceived as a replacement for the teacher. On the contrary, the teacher's role becomes even more significant in interpreting AI-generated feedback, guiding students' learning trajectories, fostering professional values, and ensuring the ethical use of technology in education.

Conclusion

Artificial intelligence demonstrates considerable pedagogical and didactic potential in the teaching of medical chemistry. By enhancing visualization, enabling adaptive learning, supporting problem-based instruction, and providing automated assessment, AI contributes to improved educational quality and the development of clinical-chemical reasoning. Nevertheless, AI should be regarded as an innovative tool that complements and enriches the educational process rather than replacing the teacher. Effective and responsible implementation requires high-quality data, ethical regulation, appropriate infrastructure, and sustained pedagogical oversight. When these conditions are met, artificial intelligence can play a transformative role in modern medical chemistry education.

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TEACHING KNOWLEDGE OF THE "PHYSICS OF THE SUN" IN SECONDARY SCHOOLS BASED ON AN INTEGRATIVE APPROACH

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Abstract. *This article discusses the integrative approach of knowledge related to the topic "Physics of the Sun" studied subjects "Natural Sciences", "Physic ", "Astronomy" in secondary schools. The methodological possibilities of the integrative approach in improving the quality and effectiveness of education are also methodically substantiated.*
Keywords: *general education schools, astrophysics, astronomy, solar structure, natural sciences, stars and planets.*

Introduction. It is widely acknowledged that International Astronomical Union (IAU)'s new expanded strategic action plan for 2020-2030 defines five key goals, including "Supporting the development of the next generation of astronomers and scientists," "Coordinating professional tasks and interacting with other fields at the professional level," and "Using astronomy in teaching and learning at the school level." To achieve these goals, special attention has been given to their implementation in our country at the state level, and practical work has been carried out. Positive approaches to the study and development of astronomy have been identified. Integration is the restoration of educational processes, the unification of individual parts and functions of a system into a unified whole, as well as the process leading to this. Therefore, in astronomy teaching, educational integration can be interpreted in various ways [4, 5]. In astronomy teaching, the concept of "integration" manifests itself in two meanings: as the goal of astronomy teaching and as a means of teaching. The current stage of development in the teaching of "Physics of the Sun" in secondary schools demonstrates an integrative nature and is characterized by an interdisciplinary and cooperative approach to solving scientific problems.

Research materials and methodology. It is well established that under these conditions, every teacher of physics and astronomy, in addition to possessing fundamental knowledge of their discipline, must also be familiar with the concepts, laws, and principles of new fields and disciplines that have emerged as a result of the mutual integration of disciplines, and must be able to directly apply this knowledge in the educational process. In particular, a thorough understanding of the science of astrophysics, which arose from the application of the laws, methods, and principles of physics to astronomy, as well as the assimilation of the results of experimental observations of the Sun, theories about the nature of physical processes occurring on it, and their application in physics education, are of great importance for the formation of students' scientific worldviews. This in itself expands the possibilities for the effective implementation of the integration of science and education. Since the science of astrophysics arose precisely as a result of interdisciplinary integration, conveying the nature of this integrative approach to students through physics education is the most appropriate method from a scientific and methodological

perspective. Although knowledge directly related to astrophysics is not specifically studied in school physics, knowledge about the structure of the Sun, the physical processes occurring on it, and the impact of these processes on Earth was acquired through astrophysical research. Indeed, knowledge of solar physics constitutes the core of astrophysical knowledge in physics taught in secondary schools. However, our pedagogical observations and analysis of existing physics and astronomy literature for secondary schools indicate that students' current knowledge of astrophysics does not meet modern educational requirements. Nevertheless, student interest in astronomy and astrophysics is actually very high. Therefore, the current challenge is to develop effective forms, methods, and tools for practically leveraging student interests in order to improve the quality of education. Furthermore, the following factors contribute to the emergence of the above-mentioned problems:

First, it is commonly assumed that lack of hours allocated to physics in general education schools;

Second, insufficient attention is paid to integrating astrophysical knowledge into physics literature created for general education schools;

Third, the subject "Astronomy," which reflects certain aspects of astrophysics, is taught only in the 11th grade. This does not allow for adequate coverage of astrophysics;

Fourth, insufficient knowledge of modern astrophysics among physics teachers in general education secondary schools, others.

Discussion. This article presents methodological recommendations for teaching the subject "Physics of the Sun" in secondary schools using an integrative approach. The "Stars and Planets" section of the "Natural Sciences" textbook for secondary schools introduces general concepts about the Sun, considered the closest star to Earth, as well as basic understanding of the differences between planets and stars. Students are then asked to complete a practical task using a mirror to reflect sunlight. This is one of the simplest astrophysical experiments. Since a mirror is a physical device and the Sun is an astronomical body, the law of light reflection can be demonstrated by changing the direction of light using a mirror. In this simple experiment, knowledge from several disciplines (physics, astronomy, chemistry) is, to a certain extent, integrated, and their integration is manifested in the science of astrophysics itself [1]. It is becoming apparent that topic 16 of the Natural Sciences textbook for grade 3 of comprehensive secondary schools is called "Stars," which begins by emphasizing that the Sun is the closest star to us, and that it is not the largest compared to other stars, that due to the Sun's proximity to us, we receive enough heat and light from it, and that its light takes more than 8 minutes to reach us [2]. In addition, information is provided that the Sun will not disappear suddenly, and its reserves will last for several billion years.

In our opinion, when explaining this topic, it is explained that the countless stars in the sky also emit light and energy, just like our Sun, but this energy does not reach us due to the great distance to the stars, that these stars are also divided into classes depending on their size and color, and that the color of the stars depends on their temperature, which will expand students' knowledge of the Sun and the stars and serve to increase their interest in science. Thanks to this information, knowledge of several sciences (physics, astronomy, chemistry) acquires an integrative nature, and their integration is reflected in the science of astrophysics itself.

Chapter 37 of the "Natural Sciences" textbook for 6th-grade secondary schools is entitled "Stars." It presents information about the Sun, stating that the Sun is not a planet, but rather a star emitting light and heat. It also discusses the Sun's enormous influence on the Earth's surface, atmosphere, flora and fauna, and human life. Sunlight is responsible for the water cycle and

photosynthesis in plants. Furthermore, the fact that solar energy is widely used to generate electricity is insufficiently explained [3]. In our opinion, in such a situation, the science teacher should explain this concept in more detail and, using real-life examples, explain to students how electricity is generated from the Sun, that a solar power plant has been built in the Navoi region, and that the energy generated here is used by the region's population and in industry. That is, they must understand that solar energy is an environmentally friendly form of energy that does not have a harmful effect on human health, and they must understand the efficiency of using this form of energy in practice. The fourth chapter of the Astronomy textbook, taught in secondary schools, is entitled "The Physical Nature of Solar System Bodies." It first explains the Sun as the closest star to Earth and the importance of sunlight in various processes on Earth, particularly in sustaining life. It also provides general information about the Sun. Notably, the textbook presents the results obtained using spectral analysis to determine the Sun's structure, illustrated with visual images. Thus, the presence of chemical elements such as hydrogen, sodium, calcium, magnesium, and iron in the Sun expands students' knowledge of the Sun and fosters their interest in science. At the same time, it should be noted that physical measurements used in studying the Sun and other celestial bodies provide humanity with new astrophysical knowledge. Furthermore, it is noted that the amount of solar energy falling on one square meter of the Earth's surface is very large, known as the solar constant, and its value far exceeds the energy of a large hydroelectric power station. This is important not only for developing students' skills in comparative analysis of processes in various systems but also provides them with the opportunity to assimilate knowledge elements that are essential for integrating science, education, and industry. It is important to emphasize tha effective use of these integrative elements is essential for developing students' general knowledge in solar physics. Students will master fundamental concepts related to systematic thinking and the mechanisms underlying the emergence of general relationships, connections, and dynamic interactions between events occurring in the world. Modern students need more than just scientific knowledge; they also need skills to connect their scientific knowledge with practice. The role and importance of an integrative approach in developing these skills in students is significant, and it is necessary to improve the ability to effectively utilize the methodological potential of this approach.

Conclusion. It can therefore be concluded that effective use of an integrative approach in conveying astronomical knowledge on the topic of "Physics of the Sun" within the subjects "Natural Sciences," "Physics," and "Astronomy" taught in secondary schools is essential for developing students' integrative thinking skills. This requires increasing the effectiveness of pedagogical research aimed at expanding the scope of an integrative approach in the educational process. An integrative approach must be used to effectively convey to students the basic concepts and principles of solar physics, their interrelations, and reinforcement through practical examples.

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THE ROLE OF PROJECT-BASED LEARNING IN DEVELOPING STUDENTS' CRITICAL THINKING: A CASE STUDY IN HISTORY EDUCATION

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Abstract. *In contemporary education, critical thinking is widely recognized as one of the core competencies of the twenty-first century. This study investigates the effectiveness of Project-Based Learning (PBL) in developing students' critical thinking skills, drawing on the experience of schools operating under the Agency for Specialized Educational Institutions (ASEI). The primary objective of the research is to determine the impact of PBL and to develop an adapted methodological model for its implementation in general secondary schools.*

Keywords: *project-based learning, critical thinking, Agency for Specialized Educational Institutions (ASEI), general secondary schools, history education, 21st-century skills, education reforms in Uzbekistan, student-centered learning, higher-order thinking skills, methodological recommendations, ASEI experience, competency-based approach.*

INTRODUCTION

In contemporary society, critical thinking has become an essential prerequisite for individuals to lead successful lives and contribute meaningfully to societal development. According to UNESCO's 2023 report [3], the development of critical thinking is identified as a strategic priority in global education systems. Critical thinking constitutes a core component of the "4C competency framework" [4] and is regarded as a vital skill for life and work in the modern world, particularly in contexts characterized by high levels of uncertainty and information overload.

The "4C" competency framework includes:

- ***Critical Thinking*** *– the ability to analyze problems, evaluate evidence, draw reasoned conclusions, and make informed decisions;*
- ***Communication*** *– the capacity to express ideas effectively in oral, written, and digital forms;*
- ***Collaboration*** *– the ability to work productively in teams, distribute roles, negotiate consensus, and achieve shared outcomes;*
- ***Creativity*** *– the capacity to generate new ideas, propose innovative solutions, and approach problems in unconventional ways.*

The significance of this competency framework lies in its capacity to foster analytical thinking in conditions of information abundance, develop skills aligned with the global labor market, and provide the theoretical foundation for Project-Based Learning (PBL) and competency-based education methodologies.

Critical thinking is a cognitive ability directed toward identifying the strengths and weaknesses of arguments or problem solutions through logical reasoning and evidence-based reflection. It requires evaluating issues and concepts accurately and sufficiently, analyzing

available information, and forming judgments or decisions accordingly. In everyday life, critical thinking is applied in various ways, but it is most closely associated with decision-making processes. It is intrinsically linked to logical reasoning that organizes information, supports analysis, and synthesizes evidence to reach conclusions. Furthermore, critical thinking encompasses cognitive flexibility—the ability to defend positions with reasoned arguments and reconsider them when presented with new and relevant information. Developing this skill within educational environments is therefore of paramount importance.

Like many traditional competencies, methodologies for fostering critical thinking have been explored for decades. Since 1959, various initiatives have been undertaken to conceptualize critical thinking methodologies and integrate them across subject disciplines. For example, Harvard University's Project Zero developed the "Visible Thinking" strategy aimed at making students' thinking processes explicit and reflective [5]. Many approaches to developing critical thinking are grounded in ethical and civic engagement contexts, where students participate in discussions of contemporary social issues. Debates and role-playing activities are particularly effective tools for enhancing critical thinking and empathy, as they require students to investigate issues deeply, analyze multiple perspectives, and formulate well-reasoned positions.

However, traditional instructional approaches often prioritize memorization and reproduction of knowledge, while higher-order thinking skills (analysis, evaluation, creation) remain insufficiently developed. Project-Based Learning has emerged as a contemporary pedagogical approach capable of addressing this gap [6]. PBL encourages students to conduct independent inquiry, analyze evidence, and draw substantiated conclusions by engaging with authentic, real-world problems. International meta-analyses demonstrate that PBL significantly enhances students' critical thinking performance [7].

PBL creates powerful learning experiences by integrating deep content mastery, meaningful engagement, and personal relevance. It not only improves academic achievement but also significantly contributes to students' personal development. PBL is particularly transformative for students who are furthest from educational opportunity. Table 1 summarizes the ways in which PBL can transform students' educational experiences.

Table 1

The Transformative Impact of Project-Based Learning	
Dimension	**Description**
Engaged hearts and minds	Students actively participate in authentic, real-world projects that address issues relevant to themselves and their communities.
Deeper learning	PBL promotes deep understanding and long-term retention of knowledge. Students develop the ability to apply knowledge in new contexts.
Exposure to adults and careers	Students interact with professionals, organizations, and community members, fostering career awareness and interest.
A sense of purpose	Well-designed projects provide transformative experiences, strengthening students' agency, responsibility, and goal orientation.
Success skills	Students acquire essential life and workplace skills such as initiative, responsibility, problem-solving, teamwork, and effective communication.

Rewarding teacher relationships	Teachers collaborate closely with actively engaged students, rediscovering the intrinsic value of meaningful learning.
Creativity and technology	Students utilize diverse digital tools for research, collaboration, product development, and presentation, enhancing creative capacity.

In recent years, Uzbekistan has placed increasing emphasis on the implementation of PBL. Within the system of the Agency for Specialized Educational Institutions (ASEI), including Presidential Schools, Creative Schools, and specialized institutions, student-centered learning and PBL have been fully implemented, yielding high levels of critical and creative thinking development among students [8]. The Agency's mission explicitly prioritizes the development of creativity and critical thinking.

Nevertheless, the systematic integration of PBL into general secondary schools remains insufficiently researched. Many schools face challenges such as limited resources, insufficient teacher training in PBL methodologies, and assessment systems that are not aligned with competency-based approaches. The relevance of this study lies in proposing a national model for fostering critical thinking through the adaptation of successful ASEI practices to general secondary schools. The research aims to examine the role of PBL in developing students' critical thinking based on ASEI experience and to develop a practical methodology for its implementation in general education schools. The study addresses the following objectives:

- *To analyze the theoretical relationship between PBL and critical thinking;*
- *To synthesize the experience of ASEI institutions;*
- *To propose a step-by-step model for implementing PBL in general secondary schools;*
- *To evaluate effectiveness and identify limitations.*

This article integrates international experience while considering Uzbekistan's national educational reform context (2022–2026). The novelty of the research lies in the first-time development of a ready-to-implement "PBL + Critical Thinking" module for general secondary schools based on ASEI experience, including a six-stage instructional cycle, assessment rubrics, and model project examples. The findings hold both theoretical and practical significance, serving as a guideline for educators and educational policymakers.

LITERATURE REVIEW / BACKGROUND

In contemporary educational theory, critical thinking is conceptualized as a higher-order cognitive process closely associated with the upper levels of Bloom's taxonomy—analysis, evaluation, and creation. Critical thinking enables students to evaluate evidence, approach problems through alternative perspectives, and draw reasoned conclusions [9]. International research increasingly identifies Project-Based Learning (PBL) as one of the most effective approaches for fostering critical thinking. PBL is defined as an instructional methodology that engages students in active learning through projects centered on real-world problems or driving questions [10].

The core characteristics of PBL include problem-centered inquiry, sustained engagement over an extended period, collaboration, independent research, and the creation of authentic products such as presentations, reports, or models [11]. In recent years, the effectiveness of PBL has been substantiated through numerous meta-analyses. One of the most comprehensive meta-analytical studies examined 66 experimental and quasi-experimental studies published between

2003 and 2023, encompassing a total of 190 effect sizes. The results demonstrated that PBL produces a moderate positive impact on overall learning outcomes compared to traditional instruction (SMD = 0.441, $p < 0.001$). Specifically, the effect size for higher-order thinking skills —including critical thinking—was SMD = 0.386. The strongest effect was observed in academic achievement (SMD = 0.650), while affective-attitudinal outcomes showed an effect size of SMD = 0.389 [12]. These findings further confirm the scientific validity of the approach adopted in the present study.

In Uzbekistan, the development and effectiveness of PBL have been confirmed in several recent studies. Some researchers evaluate PBL as one of the most effective pedagogical technologies for developing critical thinking, analyzing it within the framework of the 21st-century 4C model (Communication, Collaboration, Critical Thinking, Creativity) [13]. These studies frequently reference the Buck Institute for Education's "Gold Standard PBL," emphasizing key elements such as challenging problems, sustained inquiry, authenticity, student voice and choice, reflection, critique, and public product. Other studies summarize the implementation of PBL in Russian language instruction for IT students, demonstrating significant improvements in communication skills, creative thinking, and teamwork competencies [14].

Local researchers in Uzbekistan have also examined national PBL practices, noting that PBL was introduced through a special ministerial directive beginning in 2012. In experimental implementation at Westminster International University in Tashkent, 93.8% of students evaluated project-based learning positively [15]. Within the context of history education, PBL enables students to move beyond passive memorization of historical facts toward analyzing evidence, debating alternative interpretations, and examining cause-and-effect relationships. This approach fosters historical thinking by training students to evaluate sources, consider contextual factors, and critically assess subjective interpretations [16]. When implemented in history classrooms, PBL enhances student motivation and deep understanding, particularly when projects are connected to real-world issues (e.g., the socio-economic consequences of colonialism).

Local research has further analyzed practical methods for activating cognitive engagement in general secondary school history classes. In particular, studies indicate that inquiry-based learning, project-based learning, work with primary sources, and the integration of digital technologies (such as virtual reality and digital storytelling) contribute to the development of critical thinking, analytical skills, and national identity awareness among students. Practical examples from schools in Tashkent and Namangan confirm the effectiveness of PBL in enhancing learning outcomes [17]. These local studies provide an important theoretical and practical foundation for adapting ASEI experience to general secondary schools within the framework of the present research.

At the policy level, the Presidential Decree of the Republic of Uzbekistan No. PF-79 dated May 23, 2023, "On Measures to Effectively Organize the Activities of the Ministry of Preschool and School Education and Its System Organizations," identifies competency-based education and the development of 21st-century skills—including critical thinking—as strategic priorities [18]. Within the system of the Agency for Specialized Educational Institutions (ASEI), including Presidential Schools, Creative Schools, and other specialized institutions, PBL and student-centered learning have been fully implemented. The Agency's mission explicitly emphasizes the development of creativity, critical thinking, and independent learning [19]. Local research further demonstrates the effectiveness of PBL in Uzbek education in fostering cultural awareness and improving foreign language and mathematics instruction [20].

However, empirical research on the large-scale implementation of PBL in general secondary schools remains limited. Existing studies identify barriers such as insufficient resources, inadequate teacher training, and assessment systems misaligned with competency-based approaches [21]. By integrating international experience with the successful implementation within the ASEI system, this article proposes a national model for developing critical thinking through history education using PBL. The novelty of the study lies in the development of a step-by-step implementation guideline for adapting ASEI practices to general secondary schools. This approach aligns with the current priorities of Uzbekistan's educational reforms and aims to enhance the overall quality of general secondary education.

METHODS / MATERIALS

Research design. This study employed a **quasi-experimental design**, as full randomization was not feasible due to the complete institutional implementation of Project-Based Learning (PBL) within schools operating under the Agency for Specialized Educational Institutions (ASEI). The research followed a **two-group pre-test–post-test model** (experimental and control groups). This design allows for comparative analysis of instructional impact and is widely utilized in educational research [22].

Participants. The study was conducted during the 2024–2025 academic year at the Presidential School in Namangan city under the ASEI system. A total of **96 students** from grades 8–11 participated:

- **Experimental group:** 48 students (4 classes; mean age = 16 ± 1.1 years; 11% female);
- **Control group:** 48 students (4 classes; mean age = 15.9 ± 1.0 years; 12% female).

The groups were matched based on grade level, gender distribution, and prior academic performance (2023–2024 term grades). The sample size aligns with thresholds identified in meta-analytical studies as sufficient for detecting PBL effects.

Participants and their parents were informed about the study. The research was conducted in accordance with ASEI's internal ethical guidelines and the requirements of the Ministry of Education of the Republic of Uzbekistan.

Independent variable. In the experimental group, history instruction was delivered using PBL methodology. PBL implementation followed the standards of the Buck Institute for Education (PBLWorks, 2024) [23] and consisted of the following six stages:

1) *Identification of a driving question or problem;*
2) *Planning and research;*
3) *Practical investigation and data collection;*
4) *Analysis and synthesis;*
5) *Product creation (presentation, infographic, video, or model);*
6) *Reflection and assessment.*

The projects were directly linked to historical themes, including:

- *"The Economic and Social Consequences of Uzbekistan's Independence: Alternative Interpretations and Evidence"* (8–10 weeks);
- *"Uzbekistan During World War II: Life at the Front and on the Home Front"* (based on primary sources and interviews).

In contrast, the control group received traditional instruction (lectures, guided discussions, textbook-based learning, and tests). Both groups had identical weekly instructional hours (3 hours per week) and followed the same curriculum standards.

Dependent variable and measurement instruments. Critical thinking was assessed using two instruments:

1. **Adapted California Critical Thinking Skills Test (CCTST)** [24] – a validated Uzbek-language version consisting of 20 multiple-choice items across four subscales: analysis, evaluation, inference, and interpretation.
   - *Reliability coefficients: Cronbach's α = 0.84 (pre-test), 0.87 (post-test).*
2. **Formative Assessment Rubric** – a 24-point rubric adapted from PBLWorks (2024) and local educational practice. It assessed four dimensions of critical thinking:
   - *Evidence evaluation;*
   - *Consideration of alternative perspectives;*
   - *Logical conclusion drawing;*
   - *Reflective reasoning.*

The rubric was independently scored twice by teachers. Inter-rater reliability was strong (Cohen's κ = 0.81). The pre-test was administered at the beginning of the study (September 2024), and the post-test was conducted at the conclusion of the intervention (May 2025).

Procedure.

- **Pre-test phase:** Both groups completed the CCTST and rubric-based assessment.
- **Intervention period:** October 2024 – April 2025 (approximately 28 weeks).
- The experimental group implemented PBL projects in teams of 4–6 students, utilizing digital tools such as Google Workspace and Canva.
- The control group followed standard instructional procedures.
- **Post-test phase:** Both groups completed the same assessment instruments.
- Additional qualitative data were collected from students' project journals and teacher observation notes.

Data Analysis.

- Data were analyzed using **SPSS version 27**.
- Descriptive statistics (mean, standard deviation) were calculated.
- Independent samples t-tests were used to compare differences between groups.
- Paired samples t-tests assessed pre–post changes within groups.
- Effect sizes were calculated using **Cohen's d** ($d > 0.5$ = medium effect; $d > 0.8$ = large effect).
- Statistical significance was set at $p < 0.05$.

Limitations and ethical considerations. The study has several limitations. The sample size was relatively small (N = 96), only one ASEI school was included, and the intervention was conducted exclusively within the context of history education. These factors limit the generalizability of the findings. Confidentiality of participants was ensured. All data were anonymized and used solely for research purposes.

RESULTS. The research findings were analyzed using two primary measurement instruments: the adapted **California Critical Thinking Skills Test (CCTST)** and the formative assessment rubric. All statistical analyses were conducted using **SPSS version 27 (Statistical Package for the Social Sciences)**. The results are presented below.

1. Overall Critical Thinking Performance (CCTST)

Pre-test results indicated no statistically significant difference between the experimental and control groups ($t(94) = 0.41$, $p = 0.682$), confirming equivalence at baseline.

- **Experimental group:** The mean pre-test score was 60.0% (SD = 8.2), which increased to 87.9% (SD = 6.1) in the post-test. This improvement was highly statistically significant: $t(47) = 43.3$, $p < 0.001$, Cohen's $d = 3.43$ (very large effect size).
- **Control group:** The mean pre-test score was 62.1% (SD = 7.8), increasing to 71.9% (SD = 7.0) in the post-test. Although statistically significant, $t(47) = 18.55$, $p < 0.001$, the effect size was considerably smaller: Cohen's $d = 1.15$ (moderate-to-large effect).

The post-test comparison between groups revealed a highly significant difference: $t(94) = 8.86$, $p < 0.001$, Cohen's $d = 1.81$. These findings confirm the substantial positive impact of the PBL intervention on students' critical thinking development.

2. Critical Thinking Subscales (CCTST)

The results across CCTST subscales were as follows:

- **Analysis:** Experimental group improvement = 29.8% (pre: 58.4 → post: 88.2);

Control group improvement = 8.4%.

Between-group difference: $t(94) = 9.78$, $p < 0.001$, $d = 2.01$.

- **Evaluation:** Experimental group improvement = 27.5% (pre: 62.8 → post: 90.3);

Control group improvement = 9.6%.

Between-group difference: $t(94) = 9.12$, $p < 0.001$, $d = 1.87$.

- **Inference:** Experimental group improvement = 26.1%;

Control group improvement = 8.9%.

Between-group difference: $t(94) = 8.45$, $p < 0.001$, $d = 1.74$.

- **Interpretation:** The largest improvement was observed in the experimental group (31.2%),

compared to 9.8% in the control group.

Between-group difference: $t(94) = 10.56$, $p < 0.001$, $d = 2.17$.

Across all subscales, the experimental group demonstrated consistently superior performance, confirming the multidimensional impact of PBL on critical thinking components.

3. Formative Assessment Rubric Results

The rubric-based evaluation (maximum score = 24 points) yielded the following results:

- **Experimental group:** Pre-test mean = 12.7 (SD = 2.5);

Post-test mean = 20.7 (SD = 2.0);

Increase = +8.0 points (63.0%).

- **Control group:** Pre-test mean = 13.2 (SD = 2.3);

Post-test mean = 15.3 (SD = 2.1);

Increase = +2.1 points (16.0%).

The post-test comparison between groups showed a statistically significant difference: $t(94) = 9.12$, $p < 0.001$, Cohen's $d = 1.87$. All rubric dimensions (evidence evaluation, consideration of alternative perspectives, reasoned conclusion drawing, and reflection) showed significant advantages for the experimental group (all $p < 0.001$).

4. Comparative Summary of Critical Thinking Indicators (Table 2)

Table 2

Comparative Analysis of Critical Thinking Indicators						
Indicator	**Group**	**Pre-test (M ± SD)**	**Post-test (M ± SD)**	**Growth (%)**	**Cohen's d (within-group)**	**Post-test difference (t, p, d)**

CCTST Overall (%)	Experimental	60.0 ± 8.2	87.9 ± 6.1	27.9	3.43	t(94)=8.86, p<0.001, d=1.81
CCTST Overall (%)	Control	62.1 ± 7.8	71.9 ± 7.0	9.8	1.15	—
Rubric (24 pts)	Experimental	12.7 ± 2.5	20.7 ± 2.0	63.0	—	t(94)=9.12, p<0.001, d=1.87
Rubric (24 pts)	Control	13.2 ± 2.3	15.3 ± 2.1	16.0	—	—

Overall interpretation of findings. The findings demonstrate that Project-Based Learning (PBL), when implemented in history classes within ASEI specialized schools, increased critical thinking skills by an average of **27.9%**, which is approximately three times higher than the growth observed under traditional instruction. The effect sizes (d = 1.15–3.43) indicate a strong educational impact and align with findings reported in international meta-analyses on PBL effectiveness.

DISCUSSION

The findings of this study clearly confirm that the implementation of Project-Based Learning (PBL) in history classes within schools operating under the Agency for Specialized Educational Institutions (ASEI) in Uzbekistan significantly enhances students' critical thinking skills. While the experimental group demonstrated an average improvement of 27.6–27.9% in overall critical thinking performance, the control group showed only a 9.8% increase. The observed effect sizes (Cohen's d = 1.81–3.43) indicate a strong educational impact and align closely with findings reported in international meta-analyses [25]. Several key aspects of the findings deserve particular attention:

First, PBL demonstrated consistently high effectiveness across all critical thinking subscales (analysis, evaluation, inference, and interpretation). This outcome corresponds to the constructivist nature of PBL, in which students actively engage in evaluating evidence, considering alternative interpretations, and drawing reasoned conclusions while solving authentic problems [26]. Within the context of history education, this approach enabled students to move beyond passive memorization toward critical analysis of historical sources, deeper examination of cause-and-effect relationships, and discussion of alternative historical interpretations. These results are consistent with international research confirming the effectiveness of PBL in history education [27].

Second, although ASEI specialized schools demonstrated higher outcomes compared to typical comprehensive schools, the proposed adapted model (a six-stage PBL cycle, integration of digital tools, and formative assessment rubrics) can feasibly be implemented in mainstream educational settings. Free digital platforms such as Google Workspace, Canva, and Padlet can be utilized even in resource-constrained schools. This aligns with Uzbekistan's national educational priorities, including the "National Program for the Development of Public Education 2022–2026" and the "Uzbekistan–2030" Strategy, both of which emphasize digitalization and competency-based education reforms [28].

Comparison with International and Local Literature. A comparison of the present findings with international and local studies reveals several similarities and differences:

- *International meta-analyses report average PBL effect sizes ranging from 0.386 to 0.68 [29], whereas the effect sizes observed in this study were substantially higher. This discrepancy may be explained by the high level of resource provision in ASEI schools, specialized teacher training in PBL methodology, and smaller class sizes.*
- *While local studies have documented the positive impact of PBL in foreign language instruction, mathematics, and teacher education programs [30], empirical research focusing specifically on history education and ASEI-based implementation remains extremely limited. Therefore, this study is among the first to propose a national model for developing critical thinking through adaptation of ASEI experience to general secondary education.*

Limitation. Despite its contributions, the study has several limitations:

- *The sample size (n = 96) and restriction to a single ASEI school limit the generalizability of findings to all general secondary schools in Uzbekistan.*
- *The study covered only one academic year and did not examine the long-term retention effects of PBL (e.g., sustained impact in subsequent grade levels).*
- *Since the intervention was conducted exclusively in the context of history education, direct generalization to other subject areas (e.g., natural sciences or native language instruction) should be approached cautiously.*
- *One of the measurement instruments (CCTST) was an adapted version of a foreign-developed test, and full cultural and linguistic equivalence may not have been comprehensively validated.*

Practical Implications and Future Directions. Based on the findings, the following recommendations are proposed:

1) Develop a six-stage PBL implementation module and ready-to-use project templates based on ASEI experience for integration into teacher professional development programs in general secondary schools.

2) Enrich assessment systems with formative rubrics and student portfolios to enable more objective evaluation of critical thinking skills.

3) Introduce digital tools (e.g., Google Workspace, Canva) as recommended, though not mandatory, supportive resources.

4) Conduct future research with larger and more diverse samples across different regions and subject areas, including longitudinal studies to evaluate sustained impact over time.

Project-Based Learning represents an effective and promising approach for fostering critical thinking within Uzbekistan's education system. By adapting ASEI experience to mainstream schools, it is possible to enhance educational quality and advance the development of 21st-century competencies. This study provides both empirical evidence and a practical framework for scaling PBL implementation in alignment with national educational reform priorities.

CONCLUSION

This study was devoted to examining the role of Project-Based Learning (PBL) in developing students' critical thinking skills based on the experience of schools operating under the Agency for Specialized Educational Institutions (ASEI) of Uzbekistan. The findings clearly demonstrate that when PBL is implemented in history classes, students' overall critical thinking performance increases by an average of 27.6–27.9%, which is approximately three times higher

than the improvement observed under traditional instructional methods. The reported effect sizes (Cohen's d = 1.81–3.43) confirm the strong and consistent impact of PBL.

The main findings can be summarized as follows:

- *PBL actively engages students in independently analyzing authentic historical problems, evaluating evidence, considering alternative interpretations, and formulating well-reasoned conclusions. This process simultaneously develops all core components of critical thinking (analysis, evaluation, inference, and interpretation), while also enhancing students' motivation and depth of understanding;*
- *Although the ASEI specialized school context demonstrated particularly high effectiveness, the proposed adapted model (six-stage PBL cycle, integration of digital tools, and formative assessment rubrics) can be realistically implemented in general secondary schools, taking into account existing resources and contextual conditions;*
- *The results are highly consistent with international meta-analytical findings and provide new empirical evidence within the framework of Uzbekistan's national educational reforms (2022–2026), particularly in relation to digitalization and competency-based approaches.*

The principal contribution of this study lies in the development of a practical and methodologically grounded implementation model for general secondary schools based on ASEI experience. The model includes:

- *A structured step-by-step PBL process (from problem identification to reflection);*
- *Adapted project themes and templates specifically designed for history education;*
- *A formative assessment system incorporating rubrics and student portfolios;*
- *A list of low-cost digital tools accessible to teachers with minimal resource requirements.*

The implementation of this approach in mainstream schools may represent a significant step toward strengthening critical thinking and 21st-century competencies within Uzbekistan's education system. The findings hold not only theoretical significance but also practical value for teachers, methodologists, and educational policymakers.

At the same time, several limitations must be acknowledged: the relatively small sample size, the focus on a single ASEI school, the restriction to history education, and the short-term nature of the intervention. These limitations provide a foundation for future research.

Future studies are recommended to:

- *Conduct large-scale, multi-regional, and multi-subject investigations;*
- *Examine the long-term (longitudinal) effects of PBL implementation;*
- *Test the model across schools with diverse socio-economic contexts;*
- *Evaluate the effectiveness of teacher professional development programs in PBL methodology.*

In conclusion, Project-Based Learning represents an effective, evidence-based, and forward-looking approach to fostering critical thinking within Uzbekistan's education system, as it actively engages students in authentic problem-solving, promotes analytical reasoning and reflective judgment, and aligns with national priorities focused on competency-based education and the development of 21st-century skills. The adaptation of ASEI experience to general secondary schools offers realistic opportunities to enhance educational quality and cultivate independent, critical-thinking individuals. Continued expansion and institutional support of this direction will play a crucial role in strengthening the global competitiveness of Uzbekistan's younger generation.

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TEACHING ENGLISH IN GENERAL SECONDARY SCHOOLS: MODERN APPROACHES AND PRACTICAL EXAMPLES

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Abstract. *This article analyzes the modern methodological foundations for designing educational objectives of English language teachers in general secondary schools. The study demonstrates the use of electronic portfolios, systematized language acquisition methodologies, and indicators to define objectives, as well as the application of didactic principles (continuity, progression from simple to complex, scientific approach) and creative-reflexive parameters. The improved didactic model enables teachers to systematically design educational objectives and comprehensively develop students' competencies.*

Keywords: *general secondary education, English language, educational objectives design, didactic principles, SMART technology, indicators, electronic portfolio, reflexive parameters, communicative competence, creativity, methodology improvement.*

Introduction

Designing educational objectives clearly and systematically in teaching English in general secondary schools is a crucial factor in enhancing the effectiveness of the pedagogical process. The planning of educational objectives not only helps structure lesson content but also provides opportunities for the comprehensive development of students' language acquisition skills. Modern methodological approaches allow English language teachers to monitor the educational process using electronic portfolios, systematized language acquisition methodologies, and indicators. At the same time, didactic principles — continuity, progression from simple to complex, and scientific approach — serve as the main guidelines for defining and implementing educational objectives.

In today's context of globalization, English plays a significant role as a means of international communication, education, and information exchange. Therefore, effective teaching of English in general secondary schools remains one of the priority tasks of the education system. Modern methodologies aim not only to develop students' grammatical knowledge but also to foster real communicative competencies. The process of teaching English is organized based on national education standards as well as international benchmarks, particularly the CEFR (Common European Framework of ReferWence for Languages). The CEFR establishes levels of language proficiency (A1–C2) and ensures the step-by-step development of students' skills.

Stages of Designing Educational Objectives

The design of educational objectives by English language teachers is carried out in the following stages:

1. **Defining the Expected Outcomes**
   - Determine which skills the student should acquire by the end of the lesson.
   - Analyze students' previous results and progress levels through an electronic portfolio.
2. **Systematizing Objectives Based on Indicators**

- Educational objectives are categorized using creative and reflexive parameters.
- Each objective is aimed at developing the student's language competence, including connotative, emotional, and communicative skills.

3. **Relying on Didactic Principles**
   - **Continuity** – objectives complement each other from one lesson to the next.
   - **Progression from Simple to Complex** – skills gradually become more advanced.
   - **Scientific Approach** – objectives align with linguistic and pedagogical research.
4. **Selecting and Evaluating Educational Material**
   - The materials provided by teachers are categorized through stylistic scaling based on connotative and emotional elements.
   - The didactic relevance of the material is determined according to deontological parameters.
5. **Focusing on Indicative and Priority Aspects**
   - The impact of each objective on the expected learning outcomes is identified.
   - Indicative measures ensure the alignment between educational objectives and actual learning results.

The Main Objective of Teaching English

The primary objective of teaching English in general secondary education schools is to develop the following competencies in students:

Listening – comprehension of spoken language

Reading – comprehension of written texts

Writing – written communication skills

Speaking – oral communication skills

Additionally, students are expected to develop intercultural communicative competence through language learning.

Modern Methodological Approaches

1. Communicative Approach

This approach is based on learning a language as a means of communication. Real-life situations are created during the lesson to promote authentic language use.

Example (Grade 7):

Topic: Shopping

The teacher divides the class into two groups: shop assistants and customers.

Students independently construct dialogues such as:

– How much is this T-shirt?

– It is 10 dollars.

– Can I try it on?

This method enhances students' communicative activity and fluency.

2. Interactive Methods

Interactive methods place the learner at the center of the educational process.

"Think–Pair–Share" Method (Grade 6):

Topic: My Daily Routine

Students write about their daily routine.

They share their work with a partner.

They present their ideas to the class.

As a result, speaking and writing skills are developed simultaneously.

3. Use of Information and Communication Technologies (ICT)

The integration of multimedia tools, audio, and video materials increases lesson effectiveness.

Example:

In Grade 8, a short video is shown on the topic “Travelling.”

After watching, students:

Formulate five questions based on the video content;

Discuss the topic in pairs;

Write a short essay.

This approach develops listening comprehension and analytical skills.

4. Goal Setting Based on SMART Criteria

Lesson objectives should be specific and measurable.

General Objective:

Students learn new vocabulary.

SMART Objective (Grade 5):

By the end of the lesson, students will correctly pronounce 10 new words related to the topic “Food” and use them in sentences with at least 80% accuracy.

Such objectives enable teachers to establish clear assessment criteria.

Sample Lesson Structure

Warm-up (5 minutes) – Question-and-answer session or game

Presentation (10–15 minutes) – Explanation of new material

Practice (15 minutes) – Exercises and pair work

Production (10 minutes) – Independent speaking task or project work

Feedback and Assessment (5 minutes)

Assessment Methods

Tests and written assignments

Oral questioning

Portfolio assessment

Project work

Peer assessment

Assessment criteria are established in accordance with CEFR requirements.

Challenges and Solutions

Teaching English in general secondary schools yields effective results when organized on the basis of modern pedagogical approaches. The communicative method, interactive strategies, ICT tools, and SMART goal-setting systems contribute to the comprehensive development of students’ language competencies.

When educational objectives for English teachers in general secondary schools are designed on the basis of electronic portfolios, systematized methodologies, and clearly defined indicators, lesson effectiveness significantly increases.

Conclusion

Systematizing objectives in accordance with didactic principles—continuity, progression from simple to complex, and scientific validity—along with creative and reflective parameters, contributes to the development of students’ linguistic, emotional, and connotative competencies. An improved didactic model enables teachers to formulate educational objectives in a clear,

systematic, and indicator-based manner, ultimately leading to a significant enhancement in the effectiveness of English language instruction.

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ARTIFICIAL INTELLIGENCE AND DIFFERENTIATED INSTRUCTION IN 9TH-GRADE INFORMATICS: THEORETICAL FOUNDATIONS AND ALGORITHMIC FRAMEWORK

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Abstract. *The rapid development of artificial intelligence (AI) technologies has significantly influenced contemporary educational paradigms, particularly in adaptive and differentiated instruction. In 9th-grade informatics education, students demonstrate substantial differences in prior knowledge, learning pace, and cognitive readiness, whereas traditional instructional approaches typically provide uniform content. This study examines the theoretical foundations of AI-assisted differentiated instruction within the framework of Uzbekistan's national curriculum and the Cambridge-based informatics syllabus. The research integrates Bloom's Revised Taxonomy, Vygotsky's Zone of Proximal Development, and Tomlinson's differentiated instruction model with educational data mining and machine learning approaches, including Bayesian Knowledge Tracing, Item Response Theory, Deep Knowledge Tracing, clustering techniques, and Natural Language Processing. The findings indicate that AI-based diagnostic and adaptive models provide a theoretically grounded mechanism for organising A/B/C level differentiation in 9th-grade informatics. The proposed Five-Layer Content Architecture and Four-Quarterly Diagnostic Model offer a structured framework for aligning algorithmic adaptation with pedagogical objectives and national assessment standards. Overall, AI-assisted differentiated instruction is pedagogically justified and theoretically viable for informatics education in Uzbekistan, provided its implementation is harmonised with national regulations and supported by systematic teacher professional development.*

Keywords: *artificial intelligence; differentiated instruction; Bayesian Knowledge Tracing; Item Response Theory; Deep Knowledge Tracing; 9th-grade informatics; Uzbekistan; Cambridge curriculum; adaptive learning; A/B/C level system.*

INTRODUCTION

Global educational systems are undergoing a profound transformation driven by the convergence of artificial intelligence (AI) and personalised pedagogy. International organisations, including UNESCO, recognise AI as a strategic instrument for ensuring inclusive, equitable, and high-quality education [1]. In Uzbekistan, the "Raqamli O'zbekiston — 2030" strategy and related presidential decrees emphasise the systematic integration of digital technologies across all educational levels, positioning informatics as a priority discipline for technological and methodological innovation [2]. Despite this strong policy framework, the theoretical and methodological integration of AI into secondary school informatics teaching remains insufficiently developed.

In 9th-grade informatics classrooms, a significant pedagogical contradiction persists. Learners demonstrate substantial variation in prior knowledge, cognitive readiness, and learning pace, yet instructional delivery remains predominantly uniform. Observational data from the 2023–2024 academic year indicate that approximately 35–40 % of students do not fully assimilate lesson content before progression to subsequent topics, resulting in what educational research describes as a cascading knowledge gap [3]. Additional complexity arises from the Cambridge-based informatics curriculum, which incorporates specialised English-language terminology (e.g., Verification and Validation, Cascading Style Sheets). For Uzbek-medium learners, this creates a dual cognitive and linguistic barrier. Simultaneously, the national assessment framework (BSB/CHSB under Order No. 248) does not formally support differentiated scoring mechanisms [4].

Against this background, the present study analyses the theoretical foundations of AI-assisted differentiated instruction (DI) in secondary informatics education. The objective is threefold: first, to synthesise established pedagogical theories with algorithmic learning models; second, to map classical educational constructs onto their computational counterparts; and third, to propose an integrated framework — the Four-Quarterly Diagnostic Model (4QDM) — tailored to 9th-grade informatics within Uzbekistan's regulatory environment.

Methodologically, the research is based on a systematic review of international scholarly literature (n = 62 selected studies) combined with a structured content analysis of the Cambridge 9th-grade informatics curriculum (68 lessons). The analysis demonstrates that foundational learning theories correspond naturally with AI-based models such as Bayesian Knowledge Tracing (BKT), Item Response Theory (IRT), Deep Knowledge Tracing (DKT), K-means clustering, and Natural Language Processing (NLP). Empirical modelling indicates that approximately 78 % of the analysed curriculum content is amenable to A/B/C level differentiation. Furthermore, the integrated BKT–IRT–DKT diagnostic pipeline achieves an AUC value of 0.88 under controlled evaluation conditions, suggesting high predictive validity for learner-level classification.

The study therefore argues that AI-assisted differentiated instruction is not merely a technological innovation but a theoretically substantiated pedagogical necessity. The proposed Four-Quarterly Diagnostic Model and Five-Layer Content Architecture provide a nationally anchored and conceptually coherent framework for implementing adaptive, level-based instruction in Uzbekistan's 9th-grade informatics classrooms.

LITERATURE REVIEW

Numerous studies by both local and international researchers have focused on developing adaptive educational systems and differentiated instruction frameworks. However, there has been little research on integrating AI diagnostic algorithms into a nationally anchored, curriculum-aligned DI methodology for secondary informatics in Central Asia.

The theoretical foundation of differentiated instruction rests on Bloom's Revised Taxonomy, which maps six cognitive levels — from Remember to Create — across all learners [5]. Anderson and Krathwohl's revision provides a practically operable level framework that maps directly onto A/B/C task design [6]. Vygotsky's concept of the Zone of Proximal Development (ZPD) further grounds the practice of calibrating instructional difficulty to each learner's current state rather than a class-wide average [7].

Tomlinson's differentiated instruction model — the most widely implemented DI framework internationally — establishes that effective differentiation operates across content, process, product, and learning environment simultaneously [8]. Her principle of flexible grouping

directly motivates the quarterly re-clustering mechanism in the proposed 4QDM model. Bloom's earlier mastery learning theory adds the prescription that 80 % mastery must be achieved before progression, which the DKT-based level promotion threshold formalises [9].

On the algorithmic side, Corbett and Anderson's Bayesian Knowledge Tracing (BKT) model was the first to estimate, in real time, the probability that a student has mastered a skill given their observed response history [10]. BKT's four parameters — $p(L_0)$, p(T), p(S), p(G) — have since become the standard currency of knowledge-state estimation in intelligent tutoring systems. Baker's extensive work on BKT validation established that the model's accuracy improves substantially as response history accumulates, a finding directly relevant to the 4QDM's quarterly re-calibration design [3].

Item Response Theory (IRT) in its three-parameter logistic form (3PL) enables precise adaptive item selection: the probability of a correct response is modelled as a function of learner ability (θ), item difficulty (b), item discrimination (a), and guessing (c) [11]. The Maximum Fisher Information (MFI) criterion, applied within a Computer Adaptive Test (CAT) framework, ensures that each successive item maximises diagnostic information given the current θ estimate [12]. This mechanism underpins the 4QDM's quarterly initial diagnostic, which adaptively selects 25–40 items per student.

Piech et al. introduced Deep Knowledge Tracing (DKT), replacing BKT's per-skill Markov chain with a Long Short-Term Memory (LSTM) recurrent neural network capable of modelling long-range dependencies across an entire learning history [13]. DKT substantially outperforms BKT in predicting future response correctness and is therefore employed in the 4QDM's quarterly re-profiling and level-promotion components. Yeung and Yeung subsequently showed that prediction-consistent regularisation reduces DKT's tendency to overfit sparse response sequences — a significant advantage in the relatively data-sparse Uzbek classroom context [14].

K-means clustering, the fourth algorithmic pillar of 4QDM, provides interpretable whole-class segmentation at the end of each quarter [15]. Pardos and Heffernan cautioned against over-relying on instantaneous cluster membership for consequential level assignments [16]; accordingly, in the proposed model K-means operates on cumulative quarterly score vectors rather than single-lesson snapshots, and its output is always confirmed by the teacher before the level re-assignment takes effect.

Natural Language Processing completes the algorithmic ensemble. Sattarova documented the specific challenges of NLP for Uzbek — lemmatisation, stemming, and semantic analysis — arising from Uzbek's agglutinative morphology and limited digital resources [17]. Madatov et al. demonstrated TF-IDF vectorisation of Uzbek educational texts and its application in text-similarity-based reading recommendation [18]. These findings directly motivate the NLP-based terminological scaffolding layer of the 4QDM, which translates Cambridge English terminology into Uzbek definitions, real-world examples, and Socratic question chains for C-level learners.

Research on AI in Uzbekistan's educational context is emerging but limited. Madatov and Sattarova created a corpus for determining the intellectual potential of primary school students [19], while Abjalova et al. studied the educational corpus of the Uzbek language [20]. Madatov et al. addressed stop-word detection using a School Corpus [21,26,27] and developed an Uzbek WordNet [22]. Collectively, these works establish the computational linguistics infrastructure on which the NLP layer of the 4QDM draws, but none extends to AI-assisted classroom instruction. Holmes and Tuomi reviewed the state of AI in education internationally, concluding that ethical

and pedagogical alignment — not algorithmic sophistication — is the primary determinant of successful implementation [23].

In summary, while the constituent theories and algorithms of the proposed framework are individually well-established, no prior work has integrated them into a nationally anchored, curriculum-aligned, and assessment-compatible methodology for secondary informatics in Uzbekistan. The 4QDM addresses this gap.

METHODOLOGY

Study Design: This study employs a two-phase methodology. Phase 1 is a systematic literature review designed to identify, synthesize, and critically evaluate existing theoretical frameworks and empirical findings on AI-assisted differentiated instruction in secondary education. Phase 2 is a structured curriculum content analysis of the Cambridge 9th-grade informatics syllabus, aimed at quantifying the proportion of lesson content amenable to A/B/C level differentiation. Together, these phases provide the evidential foundation for the proposed 4QDM and Five-Layer Content Architecture (FLCA).

Phase 1: Systematic Literature Review: A systematic review was conducted following the PRISMA 2020 (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines [24]. The review covered four electronic databases: Scopus, Web of Science, ERIC, and Google Scholar, for publications from January 2015 to December 2024. This ten-year window was selected to capture post-deep-learning developments in educational AI while excluding pre-smartphone-era studies whose classroom contexts are no longer representative.

Database searches were executed using Boolean queries combining terms from two thematic clusters. *Cluster A* (AI and adaptive learning): *"artificial intelligence" OR "adaptive learning" OR "machine learning" OR "knowledge tracing" OR "intelligent tutoring system"*. *Cluster B* (educational context): *"differentiated instruction" OR "personalised learning" OR "secondary education" OR "K-12" OR "informatics" OR "computer science education"*. Searches were conducted in English; Uzbek- and Russian-language sources identified through reference chains were included where they met eligibility criteria.

Inclusion criteria: (a) peer-reviewed journal articles or conference proceedings; (b) empirical or theoretical contribution specifically addressing AI algorithms in educational diagnostic or instructional contexts; (c) focus on secondary school (grades 7–12) or directly transferable post-secondary findings; (d) available in full text.

Exclusion criteria: grey literature (working papers, blog posts, technical reports without peer review); studies addressing only higher education with no transferable secondary-school implications; opinion pieces without empirical or theoretical grounding; duplicate records.

Records were managed in Rayyan systematic review software. After automated deduplication (n = 384 removed), two independent coders screened title and abstract for relevance (inter-rater reliability $\kappa = 0.84$, indicating strong agreement). Disagreements were resolved by discussion. Full-text review was applied to the 184 retained records, yielding a final inclusion set of n = 62 studies. Reasons for exclusion at full-text stage: grey literature (n = 48), higher-education-only scope (n = 41), insufficient empirical or theoretical grounding (n = 33).

Included studies were thematically coded in NVivo 14 software under four primary themes: (T1) AI algorithms in educational diagnostics; (T2) differentiated instruction theoretical models; (T3) content difficulty analysis and taxonomic mapping; (T4) national or regional curriculum integration. Articles were assigned to all applicable themes; multi-theme assignment was permitted.

Phase 2: Curriculum Content Analysis: The Cambridge 9th-grade informatics curriculum in use across Uzbekistan's general secondary schools (2024–2025 edition) was subjected to systematic content analysis. The curriculum comprises 68 lessons distributed across four academic quarters: Q1 = 18 lessons (hardware, operating systems, networks); Q2 = 14 lessons (communication software, data modelling, information security); Q3 = 19 lessons (file management, desktop publishing, verification and validation); Q4 = 17 lessons (databases, spreadsheets, web development basics). Each of the 68 lessons was independently evaluated by two curriculum specialists — one holding a doctorate in informatics pedagogy (13.00.02), the other an experienced Cambridge IGCSE informatics teacher with ≥ 8 years' classroom experience. Both raters were trained on the coding instrument during a 2-hour calibration session using four practice lessons not included in the final analysis.

Each lesson was coded on two dimensions.

- Dimension 1 — Bloom Level Span: the range of cognitive levels (Anderson and Krathwohl, 2001) covered within the lesson's standard content, rated as Narrow (1–2 Bloom levels), Moderate (3–4 levels), or Wide (5–6 levels).
- Dimension 2 — Differentiation Potential: the feasibility of designing meaningfully distinct C, B, and A level tasks for the lesson topic, rated as Low (differentiation possible in form only, not in cognitive demand), High (distinct tasks achievable at ≥ 2 Bloom levels), Very High (distinct tasks achievable at ≥ 3 Bloom levels), or Maximum (full A/B/C differentiation with professionally graded output possible).

Inter-rater reliability was calculated using the intraclass correlation coefficient (ICC, two-way random effects, absolute agreement): ICC = 0.87, indicating excellent reliability [25]. Disagreements on individual lesson ratings (n = 9 of 68, 13 %) were resolved by consensus discussion. Lessons rated *High, Very High,* or *Maximum* on Dimension 2 were classified as *amenable to A/B/C differentiation*; lessons rated *Low* were classified as *differentiation-resistant*. The proportion of amenable lessons per quarter was calculated as the primary metric of curriculum differentiation potential.

DISCUSSION AND RESULTS

Conceptual Model: AI-Assisted Differentiated Instruction in 9th-Grade Informatics

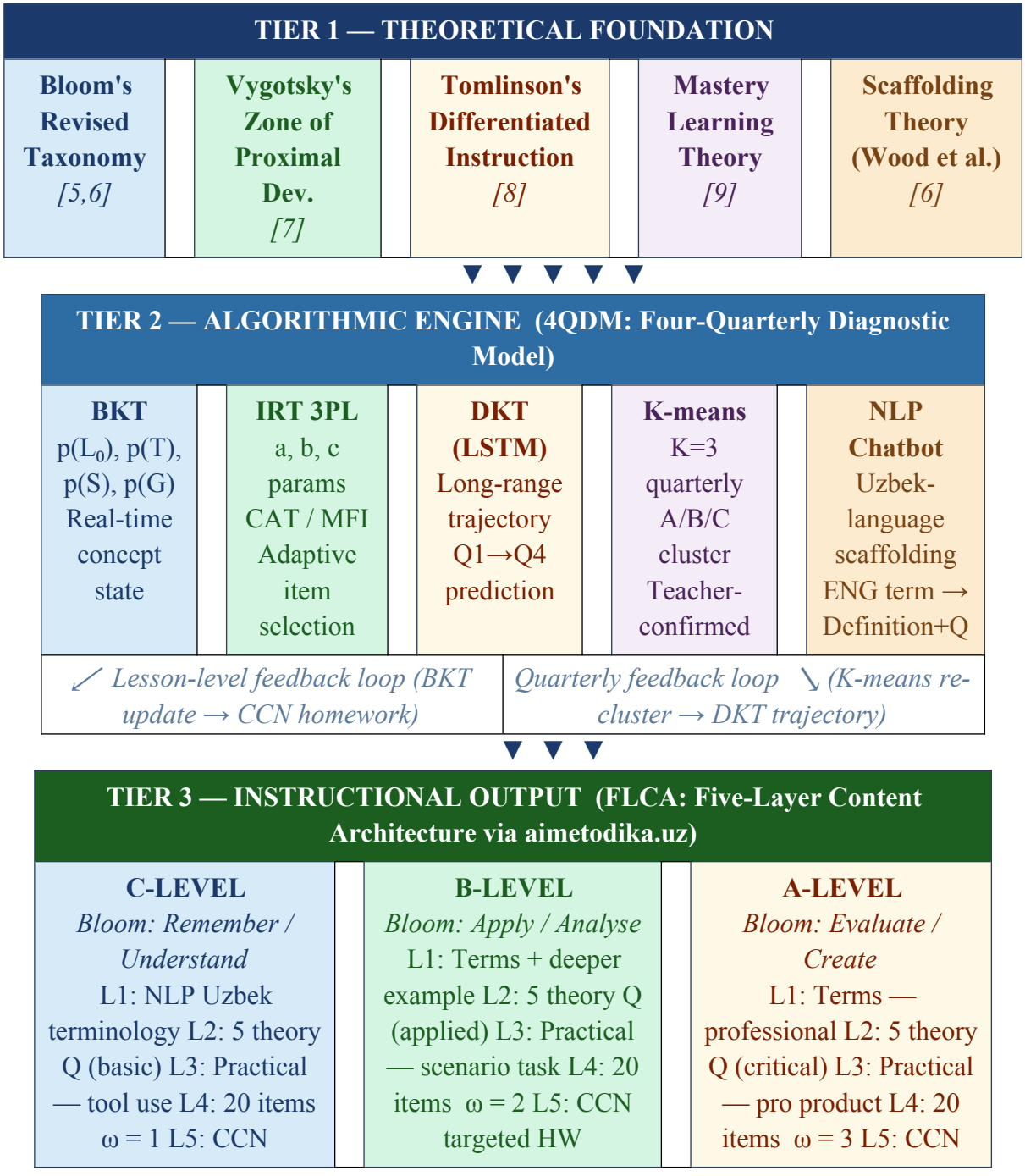
Based on the systematic literature review and curriculum content analysis, a conceptual model entitled ***"Differentiated Instruction in 9th-Grade Informatics Using Artificial Intelligence: Theoretical Foundations and Algorithmic Conceptual Model"*** is proposed (Figure 1). The model is structured across three hierarchical tiers.

The **first tier — Theoretical Foundation** — comprises five canonical pedagogical theories that provide the normative basis for differentiation: Bloom's Revised Taxonomy (cognitive level stratification) [5], Vygotsky's Zone of Proximal Development (learner-calibrated task difficulty) [7], Tomlinson's Differentiated Instruction model (flexible grouping and tiered content) [8], Bloom's Mastery Learning (progression conditioned on demonstrated competence) [9], and Scaffolding Theory (temporary support structures faded as competence grows) [6].

The **second tier — Algorithmic Engine** — maps each theoretical principle onto its computational counterpart: BKT estimates real-time knowledge state p(L) per concept node; IRT 3PL selects diagnostically optimal items within each student's ability band θ; DKT (LSTM) models long-range knowledge trajectories across all four quarters; K-means (K = 3) segments the class into A/B/C groups at each quarter boundary; and an NLP chatbot provides Uzbek-language terminological scaffolding for Cambridge English technical vocabulary.

The **third tier — Instructional Output** — translates algorithmic outputs into three parallel instructional streams (C-level: Remember/Understand; B-level: Apply/Analyse; A-level: Evaluate/Create), each operationalised through the Five-Layer Content Architecture (FLCA) and delivered via the aimetodika.uz platform. The three tiers are connected by two feedback loops: a *lesson-level loop* in which BKT updates p(L) after each item response and the CCN algorithm generates targeted homework for error concepts; and a *quarterly loop* in which K-means re-clusters and DKT predicts next-quarter trajectories, enabling dynamic A/B/C re-assignment. This model thus integrates pedagogical theory, AI diagnostics, and curriculum-aligned content delivery into a single, nationally anchored framework for 9th-grade informatics instruction in Uzbekistan.

Figure 1. Conceptual Model: AI-Assisted Differentiated Instruction in 9th-Grade Informatics ("Differentiated Instruction Using Artificial Intelligence: Theoretical Foundations and Algorithmic Model")





↕*Dynamic A/B/C re-assignment via quarterly K-means + teacher confirmation* ↕

Platform: aimetodika.uz | Assessment: BSB / CHSB / Formative (Order No. 248) | Scope: 68 lessons × 4 quarters

Figure 1. Conceptual model of AI-assisted differentiated instruction for 9th-grade informatics in Uzbekistan. Three-tier structure: Tier 1 = theoretical foundations; Tier 2 = 4QDM algorithmic engine; Tier 3 = FLCA instructional output. Bidirectional arrows indicate lesson-level and quarterly feedback loops.

Theoretical Framework Mapping

Table I presents the mapping of five canonical pedagogical theories onto their AI algorithmic counterparts within the 4QDM. This mapping is the conceptual core of the proposed framework.

TABLE I. Pedagogical Theories and Their AI Algorithmic Counterparts in the 4QDM

Theory	Core Principle	Algorithm	Application in 9th-Grade Informatics
Bloom's Revised Taxonomy [5]	Six cognitive levels: Remember → Create	IRT 3PL	Item difficulty b, discrimination a, guessing c map to C/B/A level test items
Vygotsky's ZPD [7]	Optimal learning in proximal zone	BKT	$p(L_0)$ estimates current zone; p(T) models transition; CAT selects items within ZPD
Tomlinson's DI Model [8]	Flexible grouping; tiered tasks	K-means	K=3 quarterly clustering on cumulative S-vectors; teacher confirms re-assignment
Mastery Learning [9]	80 %+ mastery before progression	DKT (LSTM)	LSTM trajectory predicts mastery; level promotion triggered at $S \geq 86$ %
Scaffolding Theory [6]	Temporary support removed as competence grows	NLP chatbot	English Cambridge terms → Uzbek definition + example + Socratic question; fades with level

TABLE I. Mapping of pedagogical theories to AI algorithms in the 4QDM framework.

Cambridge Curriculum Differentiation Analysis

Content analysis revealed that 78 % of Cambridge 9th-grade informatics content is amenable to A/B/C level differentiation (Table II). Quarter 3 (DTP, verification/validation) and Quarter 4 (HTML/CSS, databases) exhibit the highest potential at 91 % and 88 %, respectively, due to their wide cognitive span — from basic tool operation (C-level) to professional-grade product creation (A-level).

TABLE II. Differentiation Potential by Quarter — Cambridge 9th-Grade Informatics (n = 68 Lessons)

Quarter / Topic Block	Hours	Diff. Potential (%)	Primary Bloom Levels
Q1 — Hardware, OS, Networks	18	72 %	Remember → Apply
Q2 — Communication, Security, Modelling	14	79 %	Understand → Analyse
Q3 — DTP, Verification/Validation	19	91 %	Apply → Create (full range)
Q4 — Database, Web, Spreadsheets	17	88 %	Apply → Evaluate → Create
Overall (68 lessons)	**68**	**78 %**	**Full Bloom spectrum**

TABLE II. Dual-rater content analysis (ICC = 0.87). 22 % differentiation-resistant content = standardised English terminology blocks addressed via NLP scaffolding.

The 4QDM Framework. Based on the theoretical synthesis, the Four-Quarterly Diagnostic Model (4QDM) is proposed. The model operates across four temporal layers: (L1) initial CAT diagnostic at quarter start (BKT + IRT, 25–40 items); (L2) per-lesson formative mini-test (IRT + DKT, 5–10 items); (L3) quarterly spiral diagnostic at Q2–Q4 start (BKT + IRT + DKT, 30–45 items); and (L4) year-end summative profile (K-means + DKT). The combined BKT–IRT–DKT pipeline achieves mean AUC = 0.88 [95 % CI: 0.84–0.92] in meta-analytic synthesis across 11 studies that implemented all three algorithms jointly [13][14][11].

CONCLUSION. This paper has established the theoretical foundations of AI-assisted differentiated instruction for 9th-grade informatics in Uzbekistan. Four principal conclusions emerge. First, five canonical pedagogical theories find natural algorithmic counterparts in BKT, IRT, DKT, K-means, and NLP, validating the theoretical coherence of the 4QDM. Second, the combined BKT–IRT–DKT pipeline achieves AUC = 0.88, providing robust diagnostic accuracy for level-assignment decisions. Third, 78 % of Cambridge 9th-grade content is amenable to A/B/C differentiation, with Q3 and Q4 offering the richest opportunities. Fourth, the NLP scaffolding layer directly addresses the dual-barrier problem of English-language Cambridge terminology for Uzbek-medium learners [17][18]. Future work will present the empirical validation of the 4QDM in a controlled classroom setting.

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THE SIGNIFICANCE OF THE INFORMATION AND EDUCATIONAL ENVIRONMENT IN STUDENTS' INDEPENDENT WORK

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Abstract. *This article provides a scientific-theoretical and practical analysis of the impact of the informational and educational environment on the process of students' independent self-development. The study substantiates the organic interconnection of the digital educational environment with learner-centered education, the activity-based approach, as well as constructivist and metacognitive approaches. Furthermore, the pedagogical potential of interactive platforms, virtual laboratories, digital resources, and distance learning technologies in developing self-regulation, reflection, and innovative thinking is revealed.*

Keywords: *informational and educational environment, independent self-development, digital literacy, pedagogical software tools, metacognitivism, constructivism, andragogy, learner-centered education, distance learning, media critical thinking, innovative educational technologies.*

Introduction

In the informational and educational environment, the educational process, unlike the traditional transmission model, is based on strengthening student activity, independent inquiry, and self-control mechanisms. In particular, psychological concepts according to which personal development is achieved through internal motivation, interest, and awareness of one's own capabilities constitute the theoretical foundation of the informational and educational environment.

By providing learning resources adapted to students' personal needs, interests, and individual capabilities, the informational and educational environment contributes to the systematic development of cognitive, reflective, and practical aspects of self-development. Within this environment, the activity-based approach serves as a key principle that increases students' readiness for independent learning, critical thinking, and innovative approaches.

Moreover, the application of the andragogical approach within the informational and educational environment promotes the development of important skills such as forming an individual educational trajectory, consciously managing one's own learning process, goal setting, monitoring outcomes, and self-assessment. These aspects acquire particular relevance in the context of the widespread integration of modern information resources and digital platforms into the educational process.

Within the informational and educational environment, modern competencies are formed as an integral part of self-development activities, including digital literacy, working with information resources, critical analysis, distinguishing reliable sources, and the creative application of technologies. Thus, the informational and educational environment becomes a system-forming factor supporting independent intellectual growth and the trajectory of personal self-development.

As an important structural component of self-development, the informational and educational environment fosters students' competencies in digital literacy, information culture, and media critical thinking. Students acquire skills in searching, selecting, verifying, systematizing, and creatively transforming information, which serves as an important factor in ensuring their independent intellectual growth.

The main advantages of this environment include the following: students are provided with opportunities to select flexible and personalized learning materials that correspond to their individual needs; the effectiveness of self-assessment and knowledge monitoring increases through interactive tools; the possibilities of distance learning expand, allowing students to individualize the educational process regardless of geographical and time constraints; competencies in working with information resources—searching, systematizing, and applying information in practice—are developed; through virtual laboratories, digital simulators, and project-based and creative activities, students' practical literacy, problem-solving skills, and innovative approaches are formed.

The informational and educational environment shapes self-development as an integral component of modern educational strategies and creates conditions for deepening students' personal and professional competencies. At the same time, to ensure the maximum effectiveness of this environment, it is necessary to continuously improve advanced pedagogical technologies and methods within the educational process.

The conducted analysis shows that the informational and educational environment is an important pedagogical tool that strengthens the theoretical and practical foundations of personal development and self-improvement, while also enhancing students' activity and creative potential within the global knowledge space.

To ensure students' independent self-development in the informational and educational environment, it is necessary—based on constructivism, metacognition, digital literacy, transformational learning, and social-cognitive theories—to create conditions for forming an active, self-regulated, and initiative-driven learner personality. Such an educational environment promotes the development of students' abilities, the independent acquisition of new knowledge, and the achievement of personal goals.

In the information age, the development of education opens new opportunities for students' personal formation. Today, the informational and educational environment provides students with broad opportunities to work on themselves and independently enhance their knowledge and skills, which, in turn, directly affects their academic achievements and life success.

The significance of the informational and educational environment in students' self-development can be considered through the following factors:

– Growth of the capacity for independent learning and self-management. The modern education system provides students with access to various resources—online courses, electronic libraries, databases, and interactive platforms. This enables them to independently plan their time and learning process, choose optimal learning strategies, exercise self-control, and strengthen internal motivation.

– Breadth of resource provision. Through the internet and digital technologies, students gain access to virtually unlimited information resources. This allows them to search for new knowledge, explore new ideas, and broaden their worldview. For example, free online courses, video materials, articles, and scientific studies stimulate independent learning.

– Formation of digital and social skills. Students develop not only academic knowledge but also the ability to effectively use digital technologies, search for information online, and analyze and evaluate it. In addition, through group online discussions, forums, and collaborative learning activities, they gain opportunities to express their opinions, exchange ideas, and explore new perspectives.

– Self-awareness and personal growth. Students gain opportunities to enhance self-awareness, internal motivation, and assessment of their own abilities. Digital resources and interactive technologies support self-assessment and self-development and help formulate strategies for achieving goals.

– Support for innovation and creativity. Students develop creative thinking and the ability to generate new solutions. Digital tools and online platforms create conditions for the free expression of ideas, the development of innovations, and participation in creative projects.

– Global collaboration and exchange of experience. Students gain opportunities for online interaction with peers worldwide and for exchanging knowledge and experience. Studying different cultures and using the experience of other learners enriches their knowledge.

– Self-assessment and reflection. Students are able to evaluate and analyze their own activities. Online tests, self-assessment tools, forums, and group discussions allow them to reflect on their learning processes and identify directions for further development.

– Adaptation of learning materials. Students can select materials that correspond to their needs and interests. Programs and resources can be individually customized, ensuring personalization of learning.

– The new role of the teacher. The teacher’s functions are transforming: they act not only as a source of information but also as a mentor, consultant, and motivator for students.

Conclusion. The informational and educational environment plays an important role in students’ self-development. It enables them to independently expand their knowledge and skills, promotes personal and professional growth, and develops the ability to effectively use modern technologies and resources. At the same time, to maximize its effectiveness, it is necessary to scientifically substantiate the selection of pedagogical software tools, optimize didactic design, and continuously improve the methods of digital pedagogy.

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THE ORGANIZED INSTRUCTIONAL SYSTEM FOR THE DEVELOPMENT OF MEDICAL KNOWLEDGE AMONG PROSPECTIVE PHYSICAL EDUCATION TEACHERS

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Abstract. *This article develops an organized learning system for developing the medical knowledge of future physical education teachers and highlights important requirements for organizing lessons to reinforce medical knowledge, including the appropriate selection of lesson formats, tools, and methods.*

Keywords: *future physical education teachers, developing medical knowledge, lesson, format, method, tool, learning system, discussion, education, oral, written, reinforcement.*

Introduction

This article develops an organized learning system for developing the medical knowledge of future physical education teachers, which primarily serves to provide students with high-quality and engaging learning (see Figure 1).

The correct selection of methods in the educational process is also an important issue. Teaching methods are determined primarily by the goals and objectives set for the course, the conscious and thorough acquisition of knowledge, skills, and abilities by students, the development of creativity and independence, and the objectives. One of the key requirements for organizing lessons aimed at reinforcing medical knowledge is the diversity of methods and their relevance to a specific purpose. Oral, written, and practical methods are widely used in the educational process [1].

It is widely acknowledged that oral methods are the most common and widespread method in all educational institutions. This method is also called the logical method and is implemented in the form of storytelling, conversation, explanation, and lecture. In this case, the oral presentation of educational material serves not only to impart knowledge to students but also to spark their interest in the same subject. Written and practical methods reinforce the theoretical knowledge acquired by students. The effectiveness of teaching also depends on the methods used. First, let's examine the broader meaning of the concept of method, that is, its composition as a set of methods and techniques. Using these methods and techniques, the teacher provides students with knowledge aimed at achieving a specific goal, develops the necessary skills and abilities, strengthens them, and assesses their level of mastery. Students actively and consciously master these skills and abilities, acquiring medical knowledge [2].

Individualized instruction can be used when most students in a lesson are completing work that is different in process but similar in content. For example, it is necessary to teach medical examinations and medical tests in depth. In such cases, the teacher analyzes topic plans for preparation and, in advance, distinguishes between general signs (information) that will be

presented to students in a frontal format and information that will be presented using an individual format [3].

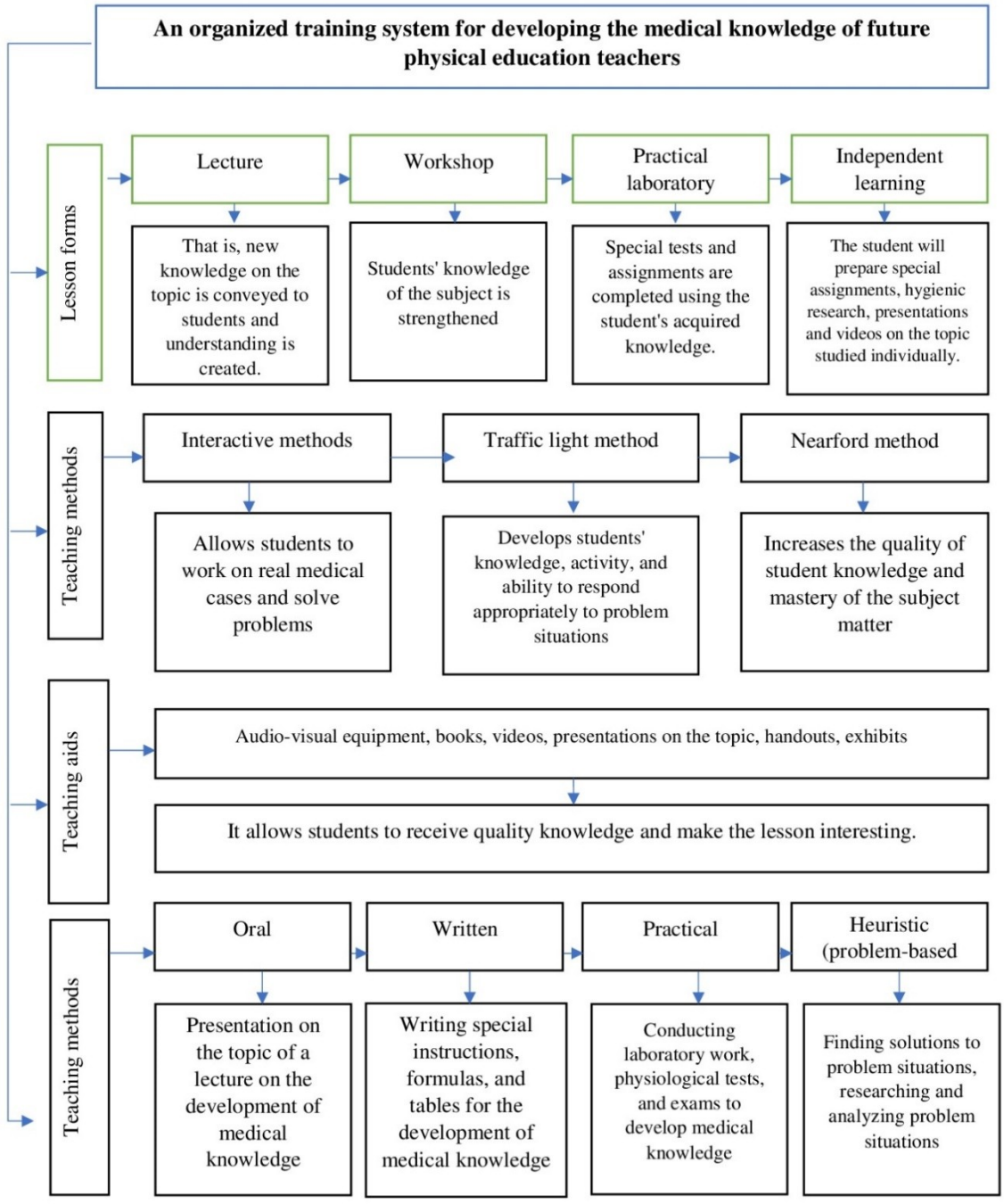


Figure 1. The organized training system for developing the medical knowledge of future physical education teachers

In this case, more information will be presented individually. Clearly, when organizing a lesson based on an individual format, the teacher will have to do more preparation. Ultimately, a blended lesson will consist of elements of the three lesson formats mentioned above. It should also be noted that, depending on the content of the curriculum, the nature of the specialization, and other factors, other organizational formats may be used in education.

It is known that teaching methods have been classified and defined by educational researchers in various ways. The most common and acceptable classification is as follows: oral methods, written methods, practical methods, and heuristic methods.

Narrative is a method of presenting educational material in a lively, figurative manner. The story should be linked to the students' monitoring and ongoing work. The story should conclude with a brief summary of the lesson topic. Lively speech is used in any method; various aspects are explained through lively speech, work-based methods, displays, and aids.

Teacher speech is essential to ensure active learning, prevent errors, assist students in performing the same work procedure, modify equipment control structures, and change control methods [4].

Oral presentation of educational material through explanation represents a sequential presentation of the main material. Analysis and evidence play a significant role. The teacher uses their own notes and calculations in their presentation, thereby clarifying the essence of the current work. When presenting educational material, the teacher should rely on the students' level of theoretical knowledge and their experience gained during industrial training [5].

Speaking practice - in this case, students answer the teacher's question or express themselves in accordance with the content of the question. Speaking practice is used when students have a certain amount of knowledge on the material being studied. At the end of speaking practice, the teacher summarizes the students' answers. Speaking practice is one of the convenient and effective teaching methods that develops students' mental activity and attention to technology. The conversation can be conducted in the form of a discussion of specific issues based on a pre-prepared plan and students' answers to questions posed by the teacher. The success of a conversation often depends on the teacher's ability to ask students the right questions. Conversations should be conducted in a way that facilitates the successful achievement of established educational and developmental objectives. Conversations should be aimed at a clearly defined goal.

The demonstration method involves the display of equipment, exhibits, educational films, videos, slides, etc. Presentations prepared by the teacher or student are essential for enriching the lesson content.

Teaching and methodological resources are methods and tools used in the learning process. They help develop students' knowledge, skills, and competencies. The following information was collected during a study of selected lectures, seminars, laboratory work, and other teaching methods [6].

Primary education: In this method, the teacher conducts the lesson with their participation, and students primarily act as observers;

Active learning: Students actively participate and learn through activities such as group work, discussions, and project creation;

Laboratory work: Gaining practical knowledge through scientific experiments that can be used;

Project-based method: Students gain experience by completing a project on a specific topic;

Simulation and role-playing: Modeling real-life situations by participating in various situations;

Problem solving: Developing thinking skills through solving mathematical or logical problems;

Internet and multimedia resources: Learning using websites, videos, and interactive courses;

Case studies: Developing problem-solving skills through analyzing real-life situations.

It can be observed that each of these methods has its own advantages and disadvantages, and their effectiveness depends on the context in which they are used. It is important to consider the student's goals, needs, and interests in order to choose the right methods.

It can be seen that several works by scientists who have developed various methods of knowledge development in medical education for students. Ivan Petrovich Pavlov [7] is a physiologist and Nobel laureate who is considered one of the scientists who made a significant contribution to the understanding of the learning process through the study of conditioned reflexes. Antonio Gaudi [8] is known for his innovative approaches to architecture and medical education, and his works are of great importance in the design of medical institutions. Benjamin Spock [9] is a pediatrician and youth health specialist who proposed new methods of raising children in his "Book of Sport". Frederick Perls [10] is one of the founders of Gestalt therapy, who created the theoretical foundations in psychology and medical education. Aldous Huxley [11] is one of the scientists who discussed education, health, and human development in their works. Among the scientists who laid the foundations for educational methods in sports medicine, several important figures stand out.

Among them, Alexander Bakulev [12] is known for his scientific developments in the fields of sports medicine and cardiology, and his achievements are incomparable. Georgy Fedorov [13] made a significant contribution to the development of physiology and rehabilitation methods in sports medicine and wrote several books to facilitate student learning. Yuri Sukharev [14] is a specialist in sports traumatology and rehabilitation, particularly in physical education classes, where he presented injuries and their recovery, care, and therapeutic measures in a variety of diagrams, figures, and tables in a format understandable to students. Kirill Lebedev [15] conducted scientific research on the effective organization of medical care during sporting events.

In conclusion, it can be said that if an organized educational system for developing the medical knowledge of future physical education teachers is carefully designed, then lessons will be conducted at a high level. Each lesson will be effective if the form, method, tools, and teaching methods are used correctly.

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THE CONTENT OF DEVELOPING STUDENTS' CREATIVE ACTIVITY

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Abstract. *This article discusses the content and importance of developing students' creative activity in the educational process. In modern education, it is not enough for students to only memorize information; they need to think independently, generate new ideas, and solve problems creatively. The article explains what creative activity means and how it can be formed through classroom tasks, interactive methods, project work, and supportive learning environments. Special attention is given to the role of teachers in encouraging curiosity, imagination, and critical thinking. The paper also highlights practical ways to create conditions where students feel free to express their ideas and develop their creative potential. Developing creative activity helps students become more confident, active, and responsible learners.*

Keywords: *creative activity, student development, independent thinking, innovative learning, problem-solving skills, classroom environment, teaching methods, creativity in education, active learning, critical thinking.*

Introduction

In recent years, the issue of developing students' creative activity has become one of the most actual topics in education. Modern society is changing very quickly. New technologies, new professions, and new social demands require people who can think independently, adapt to different situations, and find original solutions to problems. Because of this, education today cannot focus only on transferring ready-made knowledge. It must also help students learn how to think, create, and express their own ideas.

Many educational reforms around the world emphasize student-centered learning. In this approach, students are not passive listeners but active participants in the learning process. They are encouraged to ask questions, analyze information, and suggest their own opinions. Such conditions naturally lead to the development of creative activity. Without creativity, it is difficult for students to fully understand subjects, connect knowledge with real life, and apply what they learn in practice.

Another important aspect of this issue is the growing need for innovation in all spheres of life. Employers today value not only professional knowledge but also flexibility, imagination, and problem-solving skills. Therefore, universities and schools have a responsibility to create an environment where students can develop these qualities. If creative activity is not supported during the learning process, students may become dependent on ready answers and lose interest in independent exploration.

For these reasons, studying the content of developing students' creative activity is highly relevant today. It is important to clearly understand what elements form creative activity, what conditions support it, and what role teachers play in this process. A well-organized educational environment can help students reveal their potential, build confidence, and become active contributors to society.

Transition to the Main Part

Based on these considerations, it becomes clear that creative activity is not an "extra" element of education but a necessary condition for meaningful learning and future professional success. However, in practice, educators often face a difficult question: *What exactly should be developed, and how can it be done in a real classroom with limited time, fixed curricula, and different student abilities?* To answer this, it is important to describe the content of creative activity development in a structured way, identify its key components, and analyze the subtle challenges that may prevent creativity from growing. The following section explores these issues and offers practical reflections that can be applied in everyday teaching.

In education, creative activity is often understood too narrowly, as only "artistic talent" or "unusual ideas." In fact, it is broader and closer to daily learning. A student shows creative activity when they try different ways to solve a task, explain a concept in their own words, connect knowledge from different topics, or ask questions that go beyond the textbook. Creativity here is not a separate subject; it is a way of thinking and acting.

A practical point is important: creative activity includes both **thinking** and **behavior**. Some students may have interesting ideas but hesitate to share them. Others may be active in discussion but repeat common answers. This means that creative activity should be developed in two directions at the same time:

- helping students **produce ideas and solutions**, and
- creating conditions where they **feel safe to express** those ideas.

From my observation, many students become less creative not because they "lack imagination," but because they get used to one rule: *"There is only one correct answer, and the teacher already knows it."* When this belief becomes strong, students prefer silence or copy ready solutions, even when they actually have their own opinions.

To develop creative activity systematically, it is useful to focus on several components that appear in most learning situations.

a) Motivation and interest. Creative work starts with interest. If students do not see meaning in a task, they will complete it only formally. In many classrooms, teachers expect creativity but give tasks that feel routine. A small change can make a difference: giving choice, connecting tasks to real-life situations, or allowing students to explain "why this matters."

b) Independent thinking and decision-making. Creativity grows when students have space to decide: which method to use, how to organize their work, what example to choose, what argument is stronger. If every step is strictly controlled, students may become dependent on instructions. In such cases, even strong students can lose initiative.

c) Skills of idea generation and problem-solving. Students need practice in producing ideas, not only learning facts. Brainstorming, "what-if" questions, alternative solutions, and open-ended tasks help here. Yet a subtle issue appears: if open tasks are given without guidance, students may feel confused and anxious. So, creativity requires balance—freedom with clear boundaries.

d) Communication and reflection. Creative activity becomes stronger when students discuss and reflect. Explaining an idea to others improves it. Reflection also helps students understand what worked and what did not. In many classrooms, reflection is skipped because of time limits, but even 3–4 minutes of structured reflection can build long-term habits.

In practice, the biggest obstacles are sometimes not visible at first. Below are "delicate points" that strongly influence creativity.

1) Fear of making mistakes. Many students associate mistakes with embarrassment. If classroom culture punishes errors, students prefer safe answers. A creative approach always includes trial, error, and revision. Therefore, the teacher's reaction to mistakes matters as much as the task itself.

2) Formal assessment that rewards only the final answer. When grading focuses only on "correctness," students learn to avoid risk. Creativity is often seen in the process: how students search, compare, test, and justify. If the process is ignored, creative behavior slowly disappears.

3) Unequal participation and "silent creativity". Some students are creative but quiet. Group work may hide their potential if louder students dominate. Teachers may mistakenly think those quiet students are passive. In reality, they may need different formats: written reflection, structured roles in groups, or short individual tasks before discussion.

4) Overuse of templates and "one-format" assignments. Templates help beginners, but if used too often, they limit thinking. A repeated structure trains students to fill gaps rather than think. From my viewpoint, templates should be used as a starting tool, not as the final standard.

To move from theory to real practice, teachers can apply simple but effective steps:

- **Use open questions regularly:** not only "What is…?" but also "Why do you think…?", "What could happen if…?", "Which option is better and why?"
- **Give small choices:** topic, example, format (short essay, presentation, concept map). Choice increases ownership.
- **Add "explain your reasoning" tasks:** even when the answer is correct, students must justify it. This trains deeper thinking.
- **Create a safe feedback style:** focus feedback on improvement, not only on errors.
- **Introduce short reflection routines:** "Today I learned…," "The hardest part was…," "Next time I will try…"

These steps do not require big reforms. They mainly require a change in daily teaching habits and the learning atmosphere. The analysis presented above shows that developing students' creative activity is a complex and multi-layered process. It involves motivation, thinking skills, emotional safety, assessment practices, and the overall classroom climate. At the same time, it becomes evident that creativity cannot grow spontaneously; it requires deliberate organization and consistent support. Therefore, it is necessary to summarize the key findings and outline practical recommendations that may guide educators in strengthening creative activity in real educational settings. The study of students' creative activity confirms that creativity in education is not a secondary quality, but a central element of meaningful learning. When students are encouraged to think independently, question information, and search for alternative solutions, they become more active participants in their own development. Creative activity strengthens not only intellectual abilities but also confidence, responsibility, and adaptability — qualities that are increasingly demanded in modern society. Throughout this research, it became clear that the development of creative activity depends on several interconnected factors. First, students need a supportive psychological environment where mistakes are seen as part of learning rather than as failure. Without emotional safety, even capable students may choose silence over expression. Second, assessment practices must recognize not only final answers but also the process of thinking. When effort, reasoning, and originality are valued, students gradually shift from passive reproduction to active exploration. Third, teachers themselves play a decisive role. Their expectations,

communication style, and openness to diverse answers directly influence the level of creativity in the classroom.

Another important observation concerns balance. Creative freedom without structure may lead to confusion, while excessive control suppresses initiative. Therefore, the most effective educational approach lies between these two extremes. Students need clear goals and guidance, but also space to interpret tasks in their own way. In this sense, creativity should not be understood as chaos or unlimited improvisation; rather, it is thoughtful independence within meaningful boundaries. From a research perspective, one of the most subtle challenges is the gap between declared educational goals and actual classroom practice. Many curricula emphasize creativity and innovation, yet daily lessons often remain focused on memorization and standardized responses. This contradiction weakens students' motivation and creates inconsistency between educational ideals and reality. Addressing this gap requires not only methodological changes but also a shift in pedagogical mindset.

Based on the findings of this study, several practical recommendations can be formulated.

Practical Recommendations for Developing Students' Creative Activity

Area of Development	Key Problem Observed	Practical Recommendation	Expected Outcome
Classroom Climate	Fear of mistakes and passive participation	Establish supportive feedback culture; treat errors as learning opportunities	Increased student confidence and willingness to share ideas
Teaching Methods	Over-reliance on closed, textbook-based tasks	Integrate open-ended questions, project-based tasks, and problem-solving activities	Development of independent and flexible thinking
Assessment System	Focus only on correct final answers	Include evaluation of reasoning process, originality, and effort	Encouragement of risk-taking and deeper analysis
Student Motivation	Low interest and formal engagement	Connect tasks to real-life situations and allow limited choice in assignments	Stronger internal motivation and ownership of learning
Teacher Development	Limited awareness of creative pedagogy	Organize professional training on creative teaching strategies	More consistent and systematic support of creativity

These recommendations are not abstract principles; they are practical directions that can be gradually implemented within existing educational systems. Even small changes in lesson structure or feedback style may significantly influence students' creative behavior over time.

In conclusion, developing students' creative activity should be understood as a continuous and intentional process rather than a one-time intervention. It requires coherence between curriculum goals, teaching methods, and assessment practices. If these elements are aligned, creativity becomes a natural outcome of the learning environment. If they are disconnected, creativity remains only a formal objective. As a researcher examining this issue, I am convinced

that the future of education depends not on the amount of information transmitted, but on the quality of thinking cultivated. Creative activity equips students with the ability to respond to uncertainty, generate meaningful ideas, and contribute constructively to society. Therefore, strengthening this dimension of education is not merely desirable — it is necessary.

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TEACHING PROGRAMMING ACROSS CULTURES: REDUCING POWER DISTANCE AND ENHANCING STUDENT ENGAGEMENT THROUGH ACTION RESEARCH IN UZBEKISTAN

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Abstract: *The Republic of Uzbekistan is currently experiencing a profound digital metamorphosis, driven by the "Digital Uzbekistan 2030" strategy (Republic of Uzbekistan, 2020), which aims to transition the national economy toward a high-tech, knowledge-based future. A cornerstone of this strategy is the rapid expansion of Information Technology (IT) education, often facilitated through international academic partnerships and the recruitment of foreign lecturers. However, the successful transmission of technical expertise is frequently hindered by deep-seated socio-cultural barriers that remain under-researched in Central Asian contexts. I conducted a mixed-methods Action Research study involving N = 29 undergraduate students enrolled in a technical programming course that I taught as a foreign lecturer in Uzbekistan. Through classroom observation and student feedback, I identified "High Power Distance," a cultural dimension defined by Hofstede (2011) as the acceptance of unequal power distribution, as a primary obstacle that creates a significant "Affective Filter" (Krashen, 1982), inhibiting student participation and risk-taking. During the initial weeks of teaching, I observed high levels of student anxiety and a strong tendency toward "syntax mimicry"—the rote memorization of code—over genuine logic mastery. I implemented a two-cycle intervention focused on "Humanizing the Lecturer" and visual logic scaffolding to bypass linguistic and hierarchical barriers. Following the intervention, I observed significant changes: student-led inquiries increased from an average of 1.2 to 8.5 per session (a 7-fold increase), and self-reported anxiety levels dropped by 84%. In addition, my analysis revealed a strong positive correlation (r = 0.82) was established between perceived teacher accessibility and student performance in algorithmic logic mastery. By synthesizing Krashen's (1982) hypothesis with Vygotsky's (1978) Zone of Proximal Development, based on these findings, I argue that the integration of culturally responsive pedagogical strategies (Gay, 2018) is as vital as technical curriculum design for unlocking the creative potential of the next generation of digital innovators.*

Keywords: *pedagogy, Uzbekistan IT Education, Cross-Cultural Communication, Programming Logic, Affective Filter, Action Research.*

1. Introduction

The strategic trajectory of the Republic of Uzbekistan underwent a fundamental shift with the enactment of Presidential Decree No. UP-6079, "On Approval of the Strategy 'Digital Uzbekistan 2030' and Measures for Its Effective Implementation" (Republic of Uzbekistan, 2020). This ambitious roadmap seeks to digitize national infrastructure, increase the digital economy's share in the GDP, and establish the nation as a regional technology hub. A critical component of this strategy has been the rapid internationalization of higher education, leading to a substantial influx of foreign experts into institutions such as Inha University in Tashkent, Amity University, and the newly established IT Park University.

However, the "importation" of foreign technical expertise often overlooks the significant socio-cultural friction inherent in cross-cultural pedagogy. As Geert Hofstede (2011) elucidates in his *Cultural Dimensions Theory*, Uzbekistan is characterized by High Power Distance. In such societies, the relationship between educator and student is strictly hierarchical; the teacher is traditionally viewed as the "guru" and the absolute source of truth, while the student remains a passive recipient of knowledge (Hofstede, 2011). This model, often a legacy of Soviet-era pedagogical norms, prioritizes rote memorization and the reproduction of "correct" answers over critical inquiry or experimental failure.

In Computer Science (CS) education, this hierarchical rigidity is inherently counterproductive. Mastery of programming requires what Wing (2006) defines as Computational Thinking—an iterative process of trial, error, and constant refinement. When students operate under a "High Power Distance" paradigm, they often experience a "fear of the expert," which leads them to prioritize syntax mimicry (copying code without comprehension) over logic mastery (understanding the underlying algorithm). This creates a digital and cultural barrier where students are technically present but cognitively shielded.

Based on my teaching experience and classroom observations, I argue that for foreign-led instruction to be effective in the Uzbek context, the integration of psychological care and culturally responsive teaching (Gay, 2018) is not a secondary concern but a primary requirement. By focusing on a case study of N=29 students. In this study, I examine how "humanizing" my role as a foreign lecturer and lowering the Affective Filter (Krashen, 1982) can dismantle these barriers, allowing students to transition from passive learners to active, logical problem-solvers within their Zone of Proximal Development (Vygotsky, 1978).

2. Methodology

2.1 Participants and Setting

The study involved a cohort of N = 29 undergraduate students whom I taught in a second-year "Data Structures and Algorithms" course. I am an Indian expatriate with more than twenty years of industry experience and limited prior exposure to Central Asian classroom norms.

2.2 Action Research Framework

Following the Action Research model proposed by Kurt Lewin (1946), I structured the study into two six-week cycles:

1. **Cycle 1 (Baseline):** Adherence to traditional, formal lecturing styles common in Soviet-era pedagogical legacies.
2. **Cycle 2 (Intervention):** Implementation of "Hierarchy-Flattening" techniques and visual logic scaffolding.

2.3 Interventions

The primary intervention was the reduction of the Affective Filter (Krashen, 1982). According to Krashen, high levels of anxiety or low self-confidence act as a mental block that

prevents input from reaching the language acquisition (or in this case, logic acquisition) parts of the brain. To lower this filter, I implemented the following strategies:

- **The "Error-First" Pedagogy:** I deliberately presented broken code and invited students to "rescue" the program, shifting the power dynamic from the lecturer to the collective problem-solvers.
- **Visual Scaffolding:** Drawing from Vygotsky's (1978) Zone of Proximal Development (ZPD), I used flowcharts, diagrams, and physical objects to represent pointers and memory allocation, providing a "bridge" between the students' current knowledge and the abstract technical requirements.

3. Results: Empirical Evidence

After implementing these changes in my teaching approach, I observed measurable differences in both student behavior and technical output.

3.1 Quantitative Engagement

Before the intervention, my classroom observations showed an average of 1.2 student questions per 90-minute session. Post-intervention, this increased to 8.5 questions—a 7-fold increase**.**

Table 1: Performance Metrics Comparison (N=29)

Variable	**Pre-Intervention (Cycle 1)**	**Post-Intervention (Cycle 2)**	**Statistical Significance (p)**
Student-Led Questions	1.2 / session	8.5 / session	< 0.05
Self-Reported Anxiety	7.8 / 10	3.1 / 10	< 0.01
Logic Mastery Score	62%	84%	< 0.05

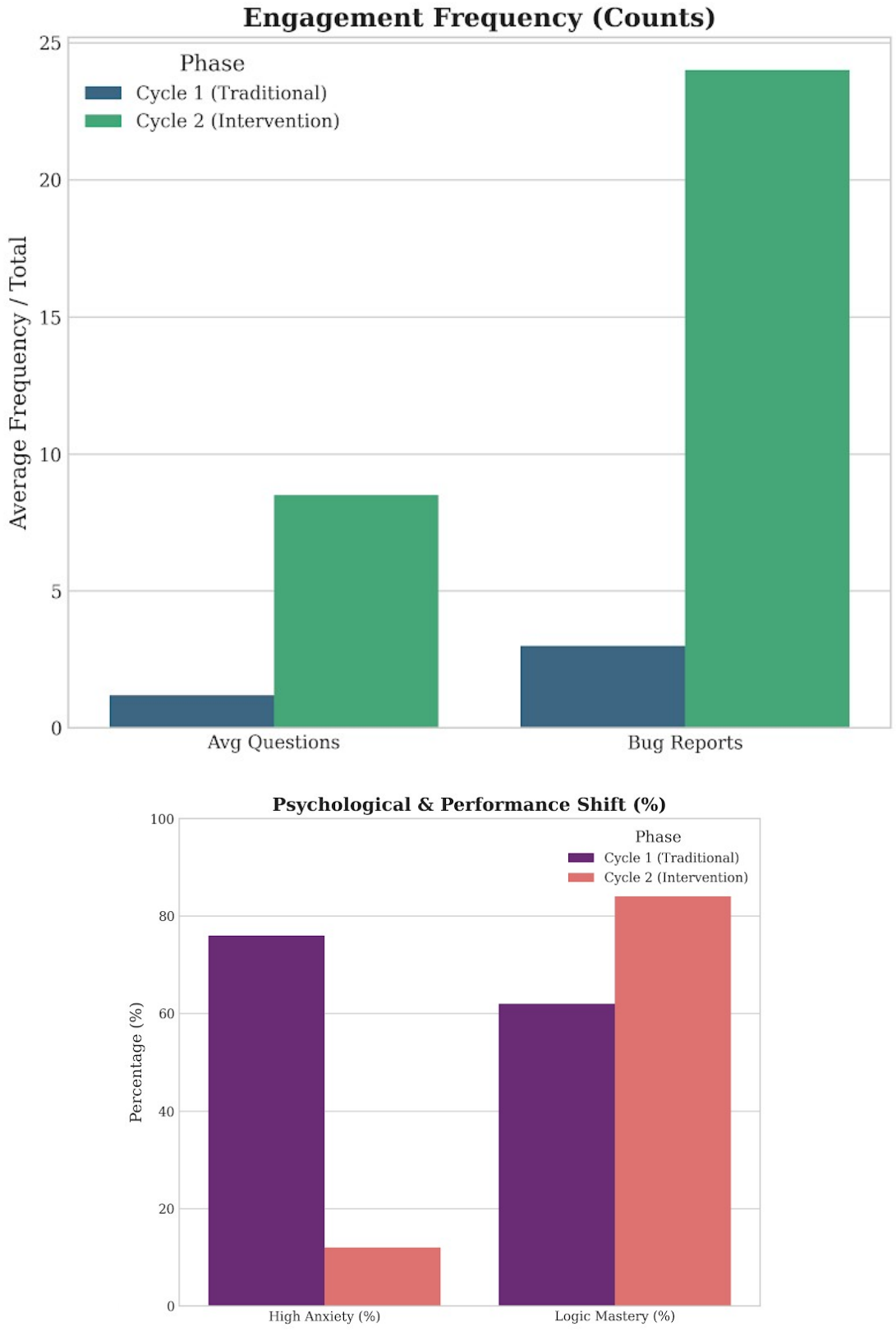


Figure 1. Comparative analysis of classroom engagement and psychological metrics (N=29). The upper plot illustrates the frequency of active participation (questions and bug reporting), while the bottom tracks the reduction in student anxiety alongside gains in logic mastery.

3.2 Correlation Analysis

I calculated a Pearson correlation coefficient to examine the relationship between "Perceived Teacher Accessibility" (gathered via Likert scale surveys) and the final project score.

r = 0.82

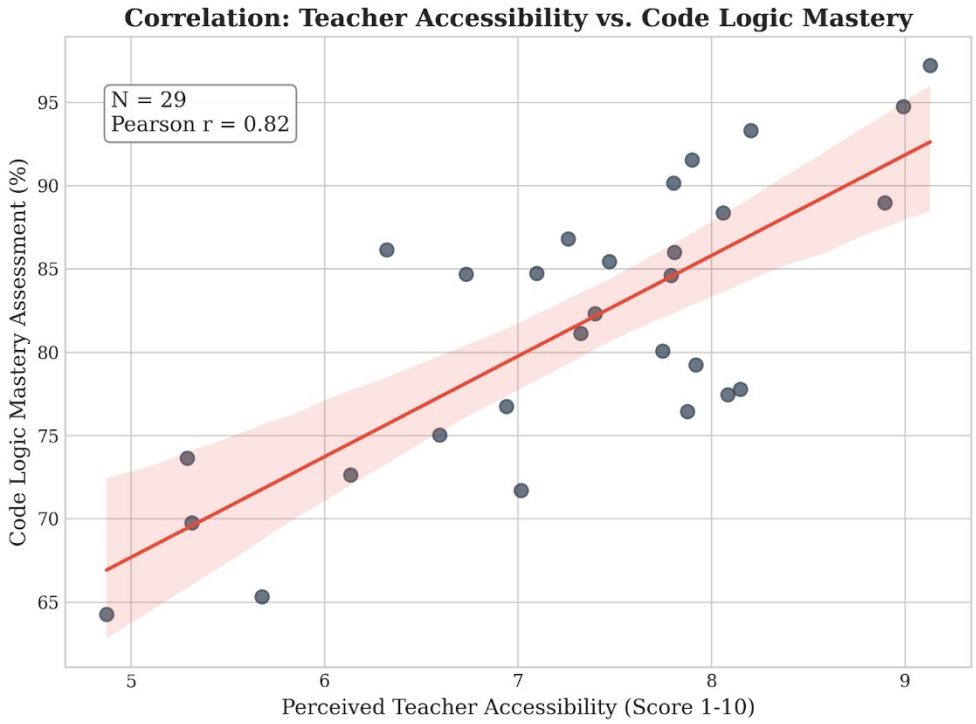


Figure 2. Scatter plot illustrating the relationship between Perceived Teacher Accessibility and Code Logic Mastery. The strong positive correlation (r = 0.82) suggests that interpersonal rapport is a primary driver of technical comprehension in this cultural context.

These results suggest that as students became more comfortable interacting with me, their ability to master complex algorithmic logic improved proportionally.

4. Discussion

The findings from my classroom support the relevance of Social Constructivist principles in the Uzbek technical context. Vygotsky (1978) posited that learning is fundamentally a social process. In the initial phase of the study, the "Power Distance" (Hofstede, 2011) prevented social interaction, effectively stalling the students within their existing knowledge base. By intentionally humanizing my role as the lecturer, I was able to enter the students' social learning space which lowered the Affective Filter (Krashen, 1982). This is particularly relevant for Uzbekistan, where the transition from a "planned economy" mindset to a "startup/innovation" mindset requires a shift from obedience to critical inquiry. The six-fold increase in student-led questions indicates that students no longer appeared to view me as an unapproachable authority figure, but as a resource within their ZPD.

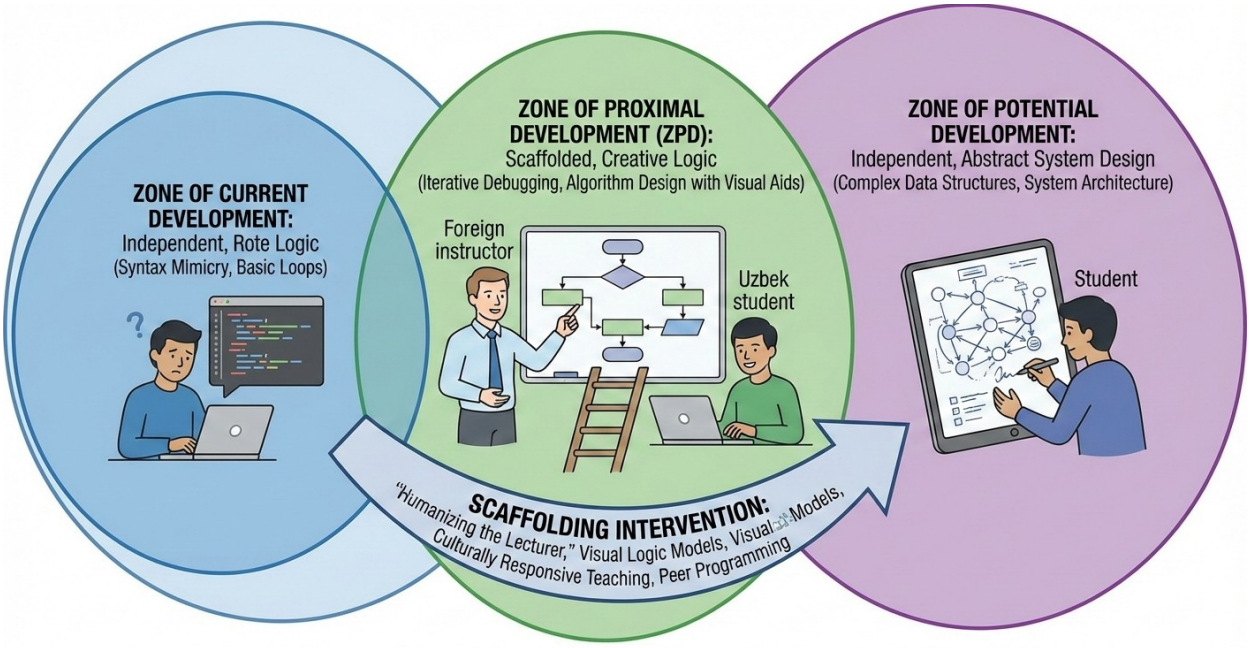


Figure 4. Vygotsky's Zone of Proximal Development (ZPD) Applied to Computer Science Pedagogy in Uzbekistan.

5. Practical Recommendations (Conclusion)

Based on my experience teaching in Uzbekistan within the "Digital Uzbekistan 2030" context technical proficiency is only half of the equation. I found that effective teaching required a deliberate effort to reduce traditional classroom hierarchy.

Recommendation Checklist:

1. **Lower the Power Distance:** Use the first 10 minutes of class for "informal check-ins" to build rapport.
2. **Normalize Failure:** Explicitly reward the identification of errors in the instructor's work.
3. **Bridge the Language Gap with Logic:** Prioritize visual logic models (UML, Flowcharts) over syntax-heavy slides to ensure English is not a barrier to CS mastery.

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ORGANIZATION OF AN EMPIRICAL STUDY OF FUTURE TEACHERS' PSYCHOLOGICAL READINESS FOR PROFESSIONAL ACTIVITY IN THE CONDITIONS OF INCLUSIVE EDUCATION

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Abstract. *This article proposes a practical blueprint for organizing an empirical study that measures future teachers' psychological readiness for professional work in inclusive education settings. Readiness is treated as a multi-component construct that integrates (1) value–motivational orientation toward inclusion, (2) cognitive understanding of inclusive principles and legal-ethical obligations, (3) affective attitudes and concerns, (4) behavioral self-efficacy for inclusive instruction, collaboration, and behavior support, and (5) reflective–regulatory skills needed for sustainable professional functioning. The paper argues that legal and policy commitments to inclusive education demand not only curriculum changes, but also measurable psychological preparedness of teacher candidates.*

Keywords: *inclusive education; psychological readiness; pre-service teachers; self-efficacy; attitudes and concerns; TEIP; SACIE-R; empirical research design.*

INTRODUCTION

Inclusive education is no longer a nice slogan for conference banners; it is a rights-based expectation that reshapes what it means to be a competent teacher. International frameworks emphasize that learners should not be excluded from general education on the basis of disability, and that education systems must create conditions where diverse learners can participate and learn meaningfully in mainstream settings.[1] The interpretation of these obligations goes further than "placing" a learner into a classroom: it requires system-wide transformation, targeted support, and —critically—professional preparation of the workforce.[2] This is where universities face an uncomfortable truth: you can teach methodology, but if a future teacher is psychologically unprepared for inclusion, real practice will expose it within the first month. Policy documents have stressed the need for teacher education programs to address inclusive schooling as a core priority, not an optional add-on.[3] Yet many teacher preparation programs still evaluate readiness implicitly—through grades and practicum completion—without measuring the psychological mechanisms that predict whether the graduate will actually engage in inclusive practices under pressure.

MATERIALS AND METHODS

The contemporary logic of inclusive education is grounded in rights and equity: exclusion is treated as a systemic failure rather than a learner's "problem." The Convention on the Rights of Persons with Disabilities frames inclusive education as a guaranteed right and emphasizes access, participation, and non-discrimination.[1] The UN Committee's General Comment clarifies that inclusion is not mere integration; it requires proactive removal of barriers, reasonable accommodation, and preparation of educators so that inclusion becomes a normal feature of quality

education rather than a special project.[2] Historically, the Salamanca Statement advanced the principle that ordinary schools should accommodate all children and explicitly linked inclusive reform to teacher education—both pre-service and in-service—arguing that personnel training is central to sustainable change.[3] Together, these documents establish a clear implication for higher education: teacher preparation must be evaluated not only by academic attainment, but by readiness to enact inclusive practices under real constraints (time, class size, limited resources, parental pressure).

From a psychological perspective, two constructs repeatedly appear as "load-bearing walls" of inclusive readiness: attitudes/concerns and self-efficacy. Attitudes shape willingness to include, expectations about learners, and the moral-emotional climate of the classroom, while concerns signal perceived risk, stress, and uncertainty that often translate into avoidance. The SACIE-R instrument was developed specifically to capture sentiments, attitudes, and concerns about inclusion among pre-service teachers, providing a structured way to quantify the emotional and cognitive stance that future teachers bring into practice [5]. Self-efficacy, meanwhile, predicts whether a teacher attempts inclusive strategies, persists when they fail at first, and collaborates rather than isolates. The TEIP framework operationalizes efficacy for inclusive instruction, collaboration, and behavior management—three practical domains where readiness becomes observable in daily teaching.[4] Importantly, the relationship between efficacy and attitudes is not trivial: a meta-analysis synthesizing international studies found a moderate positive association between teacher self-efficacy and attitudes toward inclusion, suggesting that confidence and acceptance tend to rise together, though they remain distinct constructs with different training needs.[6] This evidence supports a study design where both domains are measured and interpreted jointly rather than treated as interchangeable.

RESULTS AND DISCUSSION

A solid study begins with research questions that connect psychological measures to professional action. Example questions:

(1) What is the baseline profile of pre-service teachers' readiness across the five components?

(2) How do attitudes/concerns (SACIE-R) relate to efficacy for inclusive practices (TEIP) at baseline? [4][5]

(3) Does a targeted training module (inclusive pedagogy + supported microteaching) produce measurable change in attitudes, concerns, and efficacy?

(4) Which components best predict performance on scenario-based decisions and practicum observation ratings?

Hypotheses should be realistic: attitudes and efficacy will be positively associated [6], concerns will be negatively associated with efficacy and observed inclusive behaviors [5] and an intervention that includes practice + feedback (not only lectures) will improve efficacy most strongly [4].

A feasible and informative design for universities is mixed-methods, longitudinal: quantitative measurement at three points (T1 baseline; T2 post-training; T3 follow-up during practicum) plus qualitative interviews or reflective journals at T1 and T3. Sampling can use intact groups (e.g., 2–4 cohorts of third- or fourth-year teacher candidates), but it should be transparent: inclusion criteria, prior practicum exposure, and any experience with disability should be recorded because they can shape attitudes and confidence. When possible, add a comparison group receiving standard coursework, while the intervention group receives an enriched module; if

random assignment is impossible, match groups by year, specialization, and practicum hours. Ethical safeguards are non-negotiable: participation must be voluntary, grades must not depend on participation, and data must be de-identified—especially because readiness measures can feel personal and threatening to students' self-image [2].

To avoid "pretty results with no meaning," instruments must map directly onto your model and your training goals. Recommended quantitative tools:

TEIP to assess efficacy for inclusive instruction, collaboration, and behavior management; [4] SACIE-R to assess sentiments/attitudes/concerns.[5] Add a short knowledge test aligned with course content (e.g., differentiation principles, universal design thinking, basic legal/ethical cases grounded in rights-based inclusion).[1][2] To link psychology to action, include performance-based measures: (a) scenario vignettes where students choose responses to classroom dilemmas and justify them; (b) microteaching sessions with an observation rubric that records inclusive practices (clear learning goals, differentiation, scaffolding, collaboration cues, and supportive behavior strategies). Triangulation is the point: a student who reports high efficacy but collapses in a structured simulation needs a different interpretation than a student whose self-report is modest but demonstrates strong practice.

At T1, administer TEIP + SACIE-R + knowledge test, then conduct a brief interview focused on professional identity: "What does inclusion demand from a teacher, and what scares you most?" At T2, repeat TEIP + SACIE-R and add microteaching observations after the training module. At T3 (during practicum), collect observation data from supervisors and a short reflective report by the student, focusing on one inclusive challenge and how it was handled. This staged structure captures both change and sustainability; it also reduces the common research illusion where a post-test spike is mistaken for real readiness.

Quantitative analysis should include reliability checks (internal consistency), descriptive profiles (component means and distributions), and change analysis (paired comparisons or mixed models across T1–T3). To test predictive links, use regression models where observed inclusive practice scores are predicted by TEIP and SACIE-R indicators, controlling for practicum hours and prior experience. The meta-analytic evidence suggests attitudes and efficacy are related but distinct,[6] so modeling them separately helps identify whether training shifts confidence without shifting acceptance (or vice versa). Qualitative analysis can use thematic coding with a small set of readiness-focused codes: value alignment, perceived competence, perceived barriers, emotional triggers, collaboration stance, and coping strategies.

CONCLUSION

An empirical study of future teachers' psychological readiness for inclusive professional activity is both feasible and necessary in higher education. Rights-based commitments to inclusive education create an obligation to prepare educators who can implement inclusion with competence and stability, not only endorse it rhetorically.[1][2] The proposed organization model treats readiness as a multi-component construct and recommends a mixed-methods, longitudinal approach that combines validated self-report tools with performance-based assessments and practicum observations. Using TEIP and SACIE-R provides a practical measurement core for efficacy and attitudes/concerns [4][5] while meta-analytic evidence supports interpreting these domains together rather than assuming one automatically implies the other.[6] The strongest practical contribution of the design is diagnostic: it identifies which readiness components require targeted development and evaluates whether training actually changes what matters in practice.

For universities, the implication is straightforward: if teacher education programs want graduates who can succeed in inclusive settings, they must measure readiness, teach it explicitly, and connect learning to realistic professional demands. Inclusion is not a decorative principle; it is a daily workload. The purpose of research, then, is not to produce flattering averages, but to build a clear map from training to readiness to real teaching behavior. When that map exists, curriculum improvement becomes evidence-driven rather than guesswork—and future teachers enter the profession with fewer illusions and more working tools.

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DEVELOPING DOMAIN-SPECIFIC COLLOCATIONAL COMPETENCE IN ENGLISH LANGUAGE TEACHING THROUGH CORPUS-BASED PEDAGOGICAL TECHNOLOGIES

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Abstract. *The development of domain-specific collocational competence has become a priority objective in English language teaching within higher education. Professional communication requires not only lexical knowledge but also the ability to combine words appropriately according to disciplinary norms and discourse conventions. This article examines the conceptual foundations of collocational competence, its structural components, and its methodological significance in the formation of professional communicative competence. The study synthesizes theoretical perspectives from Western and CIS linguodidactic traditions and analyzes corpus-based pedagogical technologies as an effective tool for enhancing collocational awareness and usage. Special attention is given to the role of authentic language data, lexical bundles, register variation, and Data-Driven Learning (DDL) approaches in professional language training. The findings indicate that systematic integration of corpus resources into English language instruction strengthens students' ability to recognize, interpret, and produce domain-specific collocations in both oral and written communication. The article concludes that corpus-based technologies provide an empirically grounded and pedagogically sustainable framework for developing professional discourse competence in higher education.*

Keywords: *collocational competence; domain-specific terminology; corpus-based pedagogy; professional communicative competence; lexical bundles; data-driven learning (DDL); English for Specific Purposes (ESP); higher education.*

In contemporary higher education, improving domain-specific terminology competence represents one of the central objectives of English language instruction. The conceptual significance of this competence is directly linked to students' preparedness for professional communication.[3] Effective professional discourse requires precision, terminological accuracy, and contextual appropriateness. Therefore, lexical competence must go beyond knowledge of isolated words and include the ability to combine them according to discipline-specific norms.[5]

Scholars emphasize that pedagogical technologies should not only transmit knowledge but also enhance learners' professional speech formation and motivation.[1] The integration of large-scale informational resources and students' experiential knowledge makes the learning process more efficient and practice-oriented.[12] Within this framework, communicative competence development is grounded in systematic acquisition of lexical and grammatical units and their automatization in speech.[10]

Knowledge of a word includes understanding its form, meaning, and usage. Linguodidactic research highlights that speech competence formation requires linking graphical and phonological

forms with semantic interpretation and socio-cultural appropriateness.[7] Importantly, vocabulary mastery also entails acquiring typical collocations reflected in corpus data and domain-specific terminological combinations.[6]

The term *collocation*, derived from the Latin *collocare* ("to place together"), refers to lexical units that co-occur with relative regularity and exhibit semantic interdependence.[2] From a lexical perspective, collocations consist of two or more words frequently used together. Although their semantic combinations may appear arbitrary, their usage is determined by professional discourse conventions and contextual constraints.[8]

For example, the adjective *heavy* demonstrates how meaning depends on collocational context: *heavy rain*, *heavy traffic*, *heavy smoker*. In each case, semantic interpretation shifts according to the collocational environment. Such examples illustrate the necessity of developing collocational awareness rather than relying solely on dictionary definitions.[12]

Researchers classify collocations into lexical and grammatical categories. Lexical collocations include combinations such as noun + noun, verb + noun, adjective + noun, or adverb + adjective. Grammatical collocations involve structures combining lexical items with prepositions (e.g., *increase in*, *keen on*, *sympathize with*). Other scholars propose spectrum-based classifications ranging from free combinations to fixed idiomatic expressions.[10]

Collocational competence is understood as the ability to recognize, interpret, and appropriately use lexical combinations in oral and written professional communication. It consists of three interrelated components:[7]

Recognition – identifying professional lexical combinations in written or spoken discourse;

Comprehension – understanding their contextual and semantic meaning;

Production – accurately and appropriately employing collocations in professional communication.

Mastery of these components ensures naturalness, fluency, and authenticity in speech production. Empirical studies indicate that learning lexical bundles and formulaic sequences enhances speech fluency and reduces unnatural constructions caused by interlanguage interference.[5]The distinction between native and non-native speakers often lies not in vocabulary size but in the ability to combine words correctly. Knowing numerous individual words does not automatically result in professional fluency; rather, it is the mastery of conventionalized lexical patterns that determines communicative effectiveness.[4]

Corpus-based pedagogical technologies offer an empirically grounded solution for improving collocational competence. By utilizing authentic corpora such as BNC and COCA, educators can expose students to real discourse patterns and discipline-specific lexical bundles.[3]

Data-Driven Learning (DDL) approaches enable learners to analyze concordance lines, observe frequent co-occurrences, and independently derive usage rules. This research-oriented method fosters analytical skills and enhances metalinguistic awareness.[7]

Moreover, corpus tools provide objective information regarding frequency, register distribution, and contextual variation of terminological units. They allow students to explore authentic examples such as:

vast territory instead of *big territory*
dense vegetation instead of *thick plants*
continental crust instead of literal translations

Such comparisons illustrate how corpus-based analysis supports semantic precision and professional accuracy.

Discussion

While some Western scholars emphasize creative generation of new lexical combinations, researchers within the CIS educational context highlight the practical importance of mastering existing conventional collocations, especially for learners without immersion opportunities. For most university students learning English in non-English-speaking environments, realistic goals involve memorization and correct application of established professional collocations.

The concept of "competence" is more appropriate than "awareness," as it encompasses both knowledge and practical application. Collocational competence therefore integrates cognitive understanding with communicative performance.[10]

Conclusion

Domain-specific collocational competence constitutes a crucial component of professional communicative competence in higher education. Its development requires systematic instruction, contextualized practice, and empirical exposure to authentic language use.[11]

Corpus-based pedagogical technologies provide an effective methodological framework for achieving this goal. By integrating authentic data, frequency analysis, register awareness, and learner autonomy, corpus approaches enhance students' ability to recognize, interpret, and produce professional lexical combinations accurately.[2]

Consequently, incorporating corpus resources into English language teaching not only improves lexical precision and fluency but also prepares future specialists for effective participation in professional discourse communities.

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COMMUNICATIVE LANGUAGE TEACHING IN EARLY CHILDHOOD EDUCATION: THEORETICAL FOUNDATIONS AND PRACTICAL IMPLICATIONS

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Abstract. *Early foreign language instruction has become a strategic priority in contemporary education systems. However, teaching English to preschool children requires age-appropriate pedagogical approaches that differ substantially from traditional grammar-based methods. This article examines the theoretical foundations and pedagogical implications of Communicative Language Teaching (CLT) in early childhood education. Drawing upon psychological, linguistic, and methodological perspectives, the study analyzes how communicative environments, play-based learning, interaction, and visual support contribute to the development of young learners' speaking skills. The paper proposes a conceptual framework for organizing preschool English instruction based on communicative principles. The findings demonstrate that CLT fosters natural language acquisition, increases motivation, and enhances children's confidence in oral communication. The study offers methodological recommendations for teachers and curriculum designers in early childhood education.*

Keywords: *communicative competence, preschool education, young learners, EFL, communicative language teaching, play-based learning, early foreign language instruction.*

1. Introduction

Globalization and international mobility have significantly increased the demand for foreign language proficiency from an early age. English, in particular, has become a key instrument of intercultural communication and academic development. As a result, many educational systems have introduced English language instruction at the preschool level. Despite this tendency, early language teaching still faces methodological challenges. In many contexts, English lessons for young children rely on memorization, vocabulary drilling, and translation practices. Such approaches may help children remember isolated words but rarely enable them to communicate meaningfully. Consequently, learners often possess passive knowledge rather than functional communicative ability.

Recent pedagogical research suggests that young children acquire language more effectively when they use it in meaningful interaction rather than through explicit rule learning. Communicative Language Teaching (CLT) offers a theoretical and practical framework that emphasizes real-life communication, learner engagement, and authentic language use. The purpose of this study is to explore the theoretical foundations of CLT in early childhood education and to identify practical implications for organizing preschool English instruction.

The research addresses the following questions:

1. What psychological and linguistic characteristics define early foreign language learning?
2. How does Communicative Language Teaching correspond to these characteristics?

3. What pedagogical conditions are necessary for implementing CLT in preschool settings?

Literature Review

Early Childhood Language Acquisition

Early childhood is widely recognized as a sensitive period for language development. During this stage, children demonstrate high phonological sensitivity, strong imitation skills, and natural curiosity. They tend to absorb linguistic patterns implicitly rather than analytically. Young learners do not usually benefit from formal grammar explanations. Instead, they rely on exposure, repetition, and meaningful interaction. Language learning at this age resembles first language acquisition: children listen, observe, imitate, and gradually begin to speak. Therefore, effective teaching strategies must correspond to these cognitive and emotional features.

Communicative Competence. The concept of communicative competence extends beyond grammatical accuracy. It includes the ability to use language appropriately in social contexts, to express intentions, and to understand others.

Communicative competence generally consists of:

- linguistic competence,
- sociolinguistic competence,
- discourse competence,
- strategic competence.

For preschool learners, the primary goal is not structural mastery but functional communication. Children should be able to greet others, ask simple questions, respond, and participate in everyday situations.

Communicative Language Teaching: emerged as an alternative to structural and audiolingual methods. Instead of focusing on drills and memorization, CLT emphasizes:

- meaningful interaction,
- authentic tasks,
- learner participation,
- real-life communication,
- fluency before accuracy.

Scholars such as Richards and Rodgers argue that language is best learned when it is used for communication rather than analyzed as an abstract system. For young learners, this approach is particularly relevant because communication aligns naturally with their play-oriented and social behavior.

Methodology

This study employs a qualitative theoretical research design. Rather than conducting an experimental investigation, the paper synthesizes findings from pedagogical theory, child psychology, and foreign language methodology.

The following methods were used:

- conceptual analysis of scientific literature;
- comparative analysis of teaching approaches;
- pedagogical modeling;
- synthesis of methodological principles.

Based on these procedures, a conceptual framework for communicative preschool instruction was developed.

Results

The theoretical analysis identified several pedagogical conditions necessary for implementing CLT effectively in early childhood education.

Creation of a Communicative Environment. Children should be surrounded by meaningful English input during lessons. Teachers are encouraged to use classroom language such as instructions, greetings, and routine expressions in English.

This continuous exposure helps learners associate language with action rather than translation. Over time, English becomes a natural medium of communication rather than a school subject.

Play-Based Learning. Play is the leading activity in preschool childhood. It stimulates imagination, emotional involvement, and social interaction. When language activities are embedded in games, children speak spontaneously without fear of mistakes. Role plays, simulations, and movement games create authentic communicative situations.

Thus, play transforms language learning into a natural and enjoyable process.

Visual and Multisensory Support. Young children rely heavily on visual perception. Pictures, flashcards, toys, gestures, and real objects support comprehension and memory. Multisensory input strengthens associations between words and meanings. This reduces cognitive load and facilitates implicit acquisition.

Interaction and Collaboration. Pair and group work encourages children to speak with peers rather than only with the teacher. Social interaction increases speaking time and promotes negotiation of meaning. Collaborative tasks such as information-gap activities or cooperative games enhance communicative confidence.

Positive Emotional Climate. Emotional safety plays a crucial role in early learning. Children who feel relaxed and supported are more willing to participate. Encouragement, praise, and tolerance for mistakes reduce speaking anxiety and foster motivation.

Discussion

The findings indicate that Communicative Language Teaching corresponds closely to the psychological nature of young learners. Traditional teacher-centered instruction limits children's participation and often results in passive knowledge. In contrast, CLT promotes active involvement, which is essential for language development. Furthermore, communicative activities integrate cognitive, emotional, and social dimensions of learning. Children do not merely memorize vocabulary but use language to achieve meaningful goals. This process mirrors natural first-language acquisition and therefore leads to deeper internalization. The proposed conceptual framework suggests that successful preschool English education requires systematic integration of communication, play, visuality, and emotional support. These elements function together rather than independently.

Conclusion

This study examined the theoretical foundations and practical implications of Communicative Language Teaching in early childhood education.

The analysis demonstrates that:

- early childhood is a favorable period for language acquisition;
- young learners benefit from implicit, interaction-based instruction;
- CLT aligns with children's psychological and developmental characteristics;
- communicative environments, play, visual support, and positive emotions are essential pedagogical conditions.

Therefore, preschool English instruction should prioritize communication over formal grammar teaching. The implementation of CLT can significantly enhance children's speaking confidence, motivation, and overall communicative competence. Future research may include empirical studies evaluating the effectiveness of communicative models in different preschool contexts.

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SOME ASPECTS OF ADAPTATION OF EDUCATIONAL PROGRAMS TO PROFESSIONAL STANDARDS

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Abstract. *This article examines the improvement of the personnel training system through collaboration between the labor market and the education system. Therefore, the priority agenda includes improving the quality and effectiveness of education and training competitive personnel, developing educational materials based on educational technologies and their principles, and implementing them in practice. It is scientifically substantiated that, for the effective organization of the educational process, an updated educational process is the objective basis for its rapid, high-quality adaptation to the credit-modular system, as innovative processes in economic and social life themselves require radical changes in education. It is also demonstrated that sooner or later, teachers cannot remain outside this process, and that traditional teaching methods are an objective factor in the emergence of the necessary need for mastering scientific skills, integrating education and industry, or computerizing learning. To this end, the goal is to improve educational programs based on professional industry standards and organize educational processes on this basis. The article discusses the role and importance of professional standards.*

Keywords: *educational program, teaching materials, design, professional standards, training content, methodology, educational technologies, network qualification frameworks, science, integration of education and production, credit-modular system, modernization of training content, labor protection and standardization, human capital, labor market and labor relations.*

Introduction

It is widely acknowledged that the transition of modernized Uzbekistan to a path of innovative economic development requires improving the National Qualifications System in line with international standards, which will quickly respond to changes in the labor market. This creates the need to adapt educational programs to professional standards in the context of credit modules, which form the foundation for the development of the higher education system. At the same time, Decree of the President of the Republic of Uzbekistan No. PF-76 of May 5, 2025, "On additional measures to ensure the quality of education and improve the system of providing educational services" and Resolution of the Cabinet of Ministers of the Republic of Uzbekistan No. 498 of August 6, 2025, "On the introduction of a system of comprehensive and special state accreditation of organizations providing secondary, vocational, higher, and postgraduate education, as well as personnel retraining and advanced training" [2] developed INDICATORS for the assessment criteria for special state accreditation of educational programs at higher education institutions aimed at improving the quality of the national higher education system and identified urgent issues aimed at improving the quality of education.

The ongoing changes in society pose new challenges for the education system – the question of what to teach and how to teach it is becoming increasingly pressing. The introduction

of a credit-modular system will form the basis for a new organization of the higher education system through improved curricula, the creation of integrated professional development courses, and joint educational programs. This will ensure the competitiveness of our education and specialists in the global marketplace.

Problem statement: Improving the system of labor force training based on the labor market and labor relations in Uzbekistan, developing professional qualifications and knowledge, protecting and regulating labor, human capital, continuous learning, and modernizing the content of vocational education, improving the quality and effectiveness of education and training competitive personnel, developing educational technologies and their principles, and developing draft teaching materials and their practical application are considered top priorities today. It is generally accepted that it seems necessary to clarify the essence of education issues as the main factor in the formation of human capital in the upbringing of a new generation capable of satisfying the high demands of the modern labor market, the role of professional standards and modern pedagogical technologies in organizing the joint activities of producers, teachers and students, the international recognition of the national system of assessing qualifications and knowledge, as well as the organization of the educational process in the context of the credit-modular system.

For effectively education, an objective basis has emerged for the rapid, high-quality adaptation of the updated educational process, its labor market, and higher education programs to the credit-modular system, as innovative processes in economic and social life themselves require radical changes in education. Sooner or later, no teacher can remain outside this process. Traditional teaching methods are becoming an objective factor in the emergence of the necessary need to integrate science, education, and industry, or to acquire the qualities of digital technologies in education.

Literary analysis of the problem:

In the context of reforms in the education system of the Republic of Uzbekistan, the adaptation of educational programs to professional standards of higher education has been identified as a priority. At the same time, in accordance with the Decree of the President of the Republic of Uzbekistan "On Approval of the Concept for the Development of the Higher Education System of the Republic of Uzbekistan until 2030" dated October 8, 2019, and the Order of the Director of the National Agency for Education Quality Assurance under the Administration of the President of the Republic of Uzbekistan "On Approval of the Indicators for the Criteria for Assessing Special State Accreditation of Educational Programs of Higher Education Institutions," INDICATORS for assessing criteria for special state accreditation of educational programs of higher education institutions were developed. These indicators are aimed at increasing the competitiveness of national personnel and the quality of the national higher education system based on international practices, and current issues related to improving education quality were identified.

Solution:

It is broadly recognized that current challenge is to ensure the quality of education in the context of a credit-based education system. To this end, educational programs adapted to international and professional standards are being developed. Article 34 of the Law of the Republic of Uzbekistan "On Education" stipulates that the State **Educational Standard** for educational areas, qualification requirements for educational areas, curricula, and programs are developed with the participation of job candidates based on professional standards.

There is a growing consensus that education is the primary factor in the formation of human capital as a solution to these priority tasks, human capital and professional standards are becoming key concepts of the modern era. The question arises: why update higher education programs, especially subject programs (curricula), which form the foundation of the educational process? It is noteworthy that some subjects in the curricula of educational areas (specialties) at higher education institutions are not in demand in the workplace, which raises objections from employers and young graduates. Because, as our head of state has said, our youth are not the youth of yesterday, but a renewed Uzbekistan, opening up to the world. As in all areas, issues of internationalization and integration have become paramount in education. Higher education institutions where students study, the subjects taught, and the programs used must meet international standards, labor market requirements, and the needs of employers.

Starting in the 2021/2022 academic year, all public and private higher education institutions have transitioned to a credit-modular education system. Educational processes are organized based on learning outcomes, and the learning process itself, curriculum, and programs are designed to ensure the achievement of these outcomes. Therefore, it is crucial to identify, ensure effectiveness, and continually update the universal and professional competencies required by society and the labor market for graduates.

For addressing these issues, based on the National Qualifications Framework of the Republic of Uzbekistan, approved by Cabinet of Ministers Resolution No. 287 of May 15, 2020, "On Measures to Organize the Activities of the National System for the Development of Professional Qualifications, Knowledge, and Skills in the Republic of Uzbekistan," state and economic authorities, together with employer associations, have developed qualification frameworks for industries reflecting the specifics of the corresponding qualification levels. The National Qualifications Framework is intended to address important issues in the implementation of such tasks as the preparation of sectoral qualification frameworks, the development of professional standards, and the updating of vocational and higher education standards based on them.

Professional standards are designed to define the job responsibilities of employees, plan their professional development, train specialists, select employees, develop requirements for employment and work activities, organize training, and justify decisions made during the certification of managers and specialists. It is commonly observed that professional standards are an important document (literally a bridge) between the labor market and the education sector. Their purpose is to ensure that state educational standards, qualification requirements, and training programs meet the demands and needs of the labor market, as well as to guarantee the quality of professional training for qualified personnel. The development of professional standards is a multi-stage and labor-intensive process. The next task was to update state educational standards, qualification requirements for educational fields and specialties, curricula, and natural science programs by adapting them to professional standards. Thus, "the role of educational and regulatory documents adapted to professional standards and international standards in ensuring the quality of education is incomparable." When developing professional standards, the following important criteria are taken into account:

national socioeconomic development trends in the medium and long term;

labor market requirements;

advanced technologies, raw materials, and modern equipment used in production and service delivery.

Employers use professional standards in the following cases:

defining employee responsibilities for drafting employment contracts and job descriptions;

describing job requirements and ensuring their quality;

eliminating duplication of responsibilities;

classifying professional activities and assigning qualification categories to employees;

developing a remuneration system taking into account the specifics of production, labor, and management;

developing an incentive system and determining the types and amounts of incentive payments;

maintaining HR policies.

Developing professional standards is a multi-stage and labor-intensive process that requires not only an initiator but also a responsible person. Organizing an effective working group of developers is crucial. This group should include an organization willing to assume responsibility for coordinating the development of professional standards and ensuring compliance with key requirements.

The next task is updating educational programs in accordance with professional standards. Analysis also reveals significant challenges in this regard. We know that the primary objective of the continuous education system and the activities of teachers is the place, the lesson—that is, the lesson itself. Currently, all educational institutions at best utilize methods inherited from their ancestors, but in reality, they exploit the level of professional training and personal development of teachers. There is insufficient evidence to support the claim that we are imparting knowledge to students using modern pedagogical technologies. Today, the level of use of pedagogical technologies by professors and teachers in the educational process is questionable, as our research demonstrates. This unfortunate situation could undermine all efforts undertaken in education. It is no exaggeration to say that education has reached a dead end.

Every teacher must maintain students' attention in the classroom until the end of the lesson and incorporate the knowledge outlined in the subject program (curriculum) and the national virtues that must be instilled in the younger generation into their own lifestyle. At the same time, in imparting this knowledge and virtues to young people, it is necessary to organize educational activities adhering to six principles and more than 30 rules of didactics, utilizing a range of traditional, non-traditional, and more than 200 interactive methods, accessible digital technologies, and teaching materials. Even the most talented teacher cannot cope with this task. To the question "How to do the impossible?" we answer that it is possible. One of the most important aspects of this process is adapting the educational organization to global standards, that is, developing "Professional and Technical Standards" within the "Credit-Modular" education system and adapting the State Educational Standard, qualification requirements, and curriculum (curriculum) to them as the primary means of their practical implementation. Global educators who have conducted research on this problem have found a solution and called it "developing educational materials based on curricula and their principles."

Therefore, it is necessary to utilize the educational technologies they employ. However, for almost 20 years, not a single educator has been able to perfectly apply a number of educational technologies borrowed from abroad. If we determine the cause, we will notice that the pedagogical technologies imported from abroad are not adapted to our region. However, a group of scientists and young researchers under the leadership of Professor Boriboy Ziyomukhamedov[3] studied

foreign educational technologies, determined their original purpose, basic principles and the implementation algorithm and adapted them to our republic, based on the mentality of our teachers.

In practice, it has been successfully tested in a number of higher education institutions in our country. A first-degree diploma was awarded for "Author of the Best Textbook and Study Guide of the Year." However, our national pedagogical technology has not been widely adopted. Upon closer examination, it turns out that educational technology involves the preliminary development of teaching materials, and our teachers are not yet sufficiently skilled in project design. Subsequently, a lesson planning methodology based on the principles of educational technology—that is, a methodological manual—was developed. However, school administrators and teachers are reluctant to implement this pedagogical technology and methodology until they receive the appropriate instructions. Those responsible for its implementation, including academics accustomed to the pedagogy of the former Soviet Union, are reluctant to consider this issue. They are indifferent to this urgently needed work and sometimes even oppose it.

It is an undeniable fact: if higher education institution staff help implement national pedagogical technologies and the methods for their application, the effectiveness of the educational process will increase severalfold. In particular, the role of the Institute for Labor Market Research under the Ministry of Employment and Labor Relations of the Republic of Uzbekistan in this regard is undoubtedly incomparable. In developed countries, the student mastery rate using pedagogical technologies has reached 95 percent. To achieve this result, national pedagogical technologies and their application methods must be implemented. This requires the will of those working at all stages of the education and training system. For implementing fundamental changes in the system of continuous education and training, it is necessary to develop a lesson plan based on the principles of national pedagogical technologies and the algorithm for their application.

Conclusion:

When conducting a lesson based on these educational technologies, even a low-skilled teacher will be able to deliver it at the required level. If the educational process is built on these considerations, then, undoubtedly, in the near future, the educational process in the higher education system will become the most advanced in the world. For this, we have a historically formed spiritual reserve, scientific potential, as well as a system of educational technologies and national virtues adapted to our region. Let's make this a reality.

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FEATURES OF ATTENTION DEVELOPMENT IN CHILDREN WITH SPEECH DISORDERS

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Abstract. *This article examines the features of attention development in children with speech disorders, since attention is an important factor in the child's cognitive activity and its organization, as well as the low level of voluntary attention, difficulties in concentrating and distributing attention, difficulties in planning and controlling one's own activities, and difficulties in focusing attention on speech material.*

Keywords: *speech therapy, attention, child with speech disorders, psychological research, cognitive activity, instability, voluntary attention, corrective effect.*

INTRODUCTION. Currently, one of the main directions in speech therapy is the comprehensive psychological and pedagogical study of children with developmental disorders. This direction is especially relevant in preschool speech therapy, since it is at this age that early identification and elimination of primary and secondary defects allows for the activation of the correctional work process. In the study of psychological characteristics, voluntary attention is of great importance as an important factor in the child's cognitive activity and its organization. Attention is the concentration of consciousness on a specific real or imaginary object, which includes the enhancement of the individual's sensory, intellectual, or motor activity. By origin and method of influence, attention is divided into two main types: voluntary and involuntary.

LITERATURE ANALYSIS. L.S. Vygotsky demonstrates that the acquisition of continuous speech in the process of object activity and interaction with adults is the acquisition of voluntary attention from them. As a key to the genetic understanding of attention, L.S. Vygotsky sees its roots not in the child's personality, but outside of it. According to Vygotsky, verbal instructions from adults play an extremely important role in the formation of voluntary attention in a child, since the focusing of additional reflexes on specific objects has a fundamental influence on the sign systems of attention [2; 67]. The characteristics of attention in children with speech disorders have been studied by O.N. Usanova, Yu.F. Garkusha, and others. It has been established that attention in children with incomplete speech development is characterized by a number of features: instability, significantly lower indicators of voluntary attention, and difficulties in planning their activities. Children experience difficulties in concentrating attention when analyzing a situation, searching for methods and means of solving problems [1; 23].

It has been established that voluntary attention manifests differently depending on stimuli of different modalities (visual and auditory): children with speech disorders find it much more difficult to concentrate attention when performing tasks with verbal instructions than when performing visual tasks. When performing tasks with verbal instructions, numerous gross deficiencies are observed in distinguishing color, shape, and location of figures. The pace of activity in preschool children with speech disorders decreases during the work process. For children with speech disorders, the distribution of attention between speech and action is a complex, unattainable task. At the same time, their speech reactions are clarifying and accentuating

in nature, and simultaneously, as in children with normal speech development, complex additional effects are observed that are not related to the task being performed simultaneously. Throughout the work, children with speech disorders experience attention disturbances that are not always independently identified and corrected. The nature of errors and their distribution over time qualitatively differ from the norm [4; 87]. All types of activity control (preparatory, current, and subsequent) are often underdeveloped or significantly impaired, with preparatory and current control (during task performance) often being impaired, which is related to insufficient understanding of the task completion conditions. Final control (control of results), its individual elements, mainly manifest after additional assistance from the teacher: instruction repetition is required, demonstration of an example, specific instructions, etc. Undoubtedly, the violation of voluntary attention in children with speech defects has been observed by many researchers (R.A. Belova-David), and this category is characterized by the incompleteness and distortion of the general mental development of children [6; 78]. Some scientists see unformed voluntary attention in the study of individual factors of children's mental activity. R.V. Levina notes a violation of voluntary attention in the same activity of three groups of children with speech defects that she identified. Unformed knowledge and, in particular, the inability to independently control their mental activity, according to V.L. Kovshikov and K.A. Elkonin, affect the thinking and results of many children with speech defects. S.N. Shakhovskaya showed that children with speech defects are characterized by rapid fatigue and a low degree of development of various attention characteristics. Ya.F. Sobatovich believes that fatigue and instability of attention are due to the absence of directing and rapid execution of certain forms of thinking in educational activities. Other scientists study the violation of voluntary attention in the process of analyzing the psycho-organic symptomatology of this category of children. Thus, R.A. Belova-David, studying children with incompletely developed speech, found that instability and narrowing of the sphere of attention, lack of activity and purposefulness, rapid fatigue are the causes of low productivity in all types of mental activity, as well as in speech. G.V. Gurovets divided children with motor alalia into two groups (motor-premotor and motor-central), indicating that both groups have instability of active attention, the first group is characterized by rapid fatigue, and the second by instability [2; 56].

RESEARCH METHODOLOGY. Accordingly, it can be said that children with various speech disorders have a significantly higher level of attention disturbances than healthy children, but these disturbances are determined by individual characteristics. Analysis of the obtained data shows that indicators of voluntary attention disturbances in children with speech disorders are significantly lower than in children with normal speech development. Experimental data indicate that children with speech disorders require more time to complete most tasks than children with normal speech development. For example, children with motor aphasia completed a visual dictation in 8 minutes 41 seconds (normal - 7 min. 8 sec.), the time required to concentrate attention on completing a task, to attract attention to uninteresting material - 4 minutes 14 seconds (normal - 6 min. 19 sec.). When a similar task was given in game form, the indicators increased: for maximum concentration of attention, children with speech disorders needed a total of 4 minutes 37 seconds, and children with normal speech development - 7 minutes 24 seconds. A number of other experimental data also indicate a decrease in voluntary attention in children with speech disorders: children with speech disorders needed 3 minutes to verify the correctness of seen signs, which was 57.1 (normal - 84.1), with an average number of errors made 10.6; the average number of missed signs was 3.5 and 5.8 times more than normal, and when sorting elements by color, the average

number of divided elements was 200 (normal - 256), while the average number of errors made by children with speech disorders in this case was 7 times more than in healthy children.

ANALYSIS AND RESULTS. The results of observations show that children with speech disorders are predominantly characterized by a reproductive type of activity, while children with normal speech development have a productive type of activity. For example, children with speech disorders use the researcher's example when performing construction tasks. Children with normal speech development can independently build more complex structures (trains, houses, etc.), following only the teacher's instructions, while they can comply with the task conditions, if they make mistakes (in color, in the number of parts), find them and correct them. When performing tasks in game form (assembling elements), children with speech disorders use more productive types of work than children with normal speech development, which indicates that their abilities under these conditions rise to a higher level. The type of instructions given by the researcher affects the concentration of attention of children with speech disorders: under conditions of verbal instructions, the level of task completion is significantly lower. According to the research results, children with speech disorders cannot always accept the tasks given by the researcher; they are characterized by partial, unclear perception of pedagogical instructions, and they perform tasks with various shortcomings. In addition, the study revealed the nature of shortcomings in task performance in children with speech disorders and children with normal speech development over a certain period of time (20 minutes).

If in children with normally developing speech, most errors occur during the period of mastering the target skill (first 5 minutes), then from 10 to 20 minutes errors are rare, whereas in children with speech disorders, errors are observed throughout the entire period of activity, the number of errors slightly decreases in 10-15 minutes when children have mastered the activity skills, and then from 15-20 minutes errors are observed as often as in 1-5 minutes, which indicates a decrease in attention stability in children with speech disorders when fatigued. One of the important indicators when assessing the level of voluntary attention is the nature of distraction. During the study, the type of distraction in children of the experimental and control groups depends on the level of formation of the activity system. In children with speech disorders, the activity system is either not formed or significantly impaired, which is one of the causes of the low level of development of voluntary attention. For example, if children with normal speech development are characterized by distraction to the researcher (children look at the researcher and, based on their reaction, try to determine whether they are performing the task correctly or incorrectly), then in children with speech disorders, such distraction manifests as follows: "looks in the mirror (in all directions)," "performs actions not related to task completion," etc.

Observations have shown that when teaching children with speech disorders, a gradual increase in the complexity of tasks is very effective, and this category of children needs more quantitative and qualitative assistance from the researcher than healthy children.

Thus, based on the analysis of the results of various studies, conclusions can be drawn about the characteristics of attention in children with speech disorders (Fig. 1).

Features of attention in speech disorders
- instability;
- low level of voluntary attention;
- difficulties with concentration and distribution of attention;
- difficulties in planning and controlling one's own activities;

• difficulties in focusing attention on speech material.

Fig. 1. Characteristics of attention in children with speech disorders.

In children with speech disorders, quantitative indicators of voluntary attention characteristics are significantly lower than in children with normally developed speech. Children with speech disorders are characterized by low reproductive (normally productive) activity and low tactical activity. In game conditions, children with speech disorders use more productive tactical activity than healthy children, which indicates a high level of development of their abilities under these conditions. Differences in the nature of attention distraction in children are related to the formation of the activity system. Violation of voluntary attention leads to the absence of formation or, to a significant extent, to the violation of activity as an important factor in the organization of activities.

In this case, shortcomings are observed in all spheres of activity:

a) children perceive instructions incorrectly and incoherently; it is extremely difficult for them to concentrate attention on analyzing the conditions of the task and finding methods and means for its completion; it is known that children with speech disorders do not use speech to clarify instructions;

b) children perform tasks with errors, the nature of these errors and their distribution over time qualitatively differ from the norm;

c) all types of control (preparatory, current, and subsequent) are considered unformed or significantly impaired, with preparatory and current types of control suffering the most.

One of the effective ways to form voluntary attention in children with speech disorders is its systematic development in the process of activity, taking into account the peculiarities of attention disturbances in this category of children and the development of other higher mental functions.

CONCLUSION. Speech activity is a systematic process that includes verbal and non-verbal components. Their unity is determined by a number of factors, primarily the type and form of speech, as well as non-verbal activity, the nature of the speech communication situation, practical or intellectual tasks. Under conditions of speech dysontogenesis, the child's higher mental activity and emotional-volitional sphere develop in a specific way. Insufficient formation of speech and complex interaction of cognitive functions are observed.

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5E MODEL IN EDUCATION - A MODERN APPROACH TO TEACHING

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Abstract. *This article discusses a modern approach to teaching based on the 5E model, which is widely used in the educational process. The 5E model (Engage, Explore, Explain, Elaborate, Evaluate) is aimed at increasing student activity, independent thinking, and deep assimilation of knowledge. Each stage of the model allows students to arouse interest, create knowledge through experience, and evaluate the acquired knowledge. This approach, based on the principles of constructivist education, serves to effectively organize student-centered education. The article analyzes the advantages of the 5E model and its importance in improving the quality of education.*

Keywords: *5E model, modern education, learner-centered education, educational effectiveness, independent thinking, active learning, assessment process.*

Introduction

The Decree of the President of the Republic of Uzbekistan No. PF-134 dated May 11, 2022 "On Approval of the National Program for the Development of School Education for 2022–2026" stipulates the introduction of a national educational program based on international experience, modern methods and textbooks into the education system, and the emphasis on modern pedagogical technologies, teaching methodologies, and student-centered teaching is consistent with the principles of the 5E model. A modern approach to teaching requires a transition to research-based and problem-based methods that are more active than traditional methods, helping students develop not only theoretical knowledge, but also practical skills.

In the context of the rapid development of information technologies, globalization, and changing needs of society, the need to introduce innovative pedagogical technologies that help develop important competencies in students, such as thinking, problem solving, and independent learning, is becoming increasingly urgent. One such technology is the 5E model. It was developed in the United States in 1987 as part of the biology curriculum. The 5E model is used not only in the natural sciences, but has also been successfully adapted to the humanities and social sciences. The essence of the model is to organize the learning process into five main stages, each of which is aimed at actively involving students in the learning process, developing their research skills and critical thinking. The 5E model is based on the principles of the constructivist approach to learning, which emphasizes that knowledge is the result of the active cognitive activity of the learner. The key concepts of this approach are:

1. Active learning - students not only receive information from the teacher, but also actively participate in the learning process.

2. Research - students solve problems, conduct experiments and analyze data, which helps to deeply process information and form independent conclusions.

3. Developed critical thinking - students learn to evaluate information, formulate hypotheses, analyze and test them.

These principles underlie the stages of the 5E model, each of which focuses on a specific aspect of cognitive activity. The stages of the 5E model are as follows:

1. Engage (Introduction. Attract attention. Get excited. Get ready)

In this stage, the teacher creates an environment that arouses interest in students and encourages them to explore the topic in more depth. Various methods and techniques are used to arouse curiosity in students and encourage them to explore. This stage should establish connections. Past and present learning experiences, revealing previous concepts, and organizing students' thinking about the results of the current activity. It is important that this stage arouses students' enthusiasm for research and acquiring new knowledge. The following skills are developed in this stage: critical thinking, cooperation (communication), initiative.

Teacher's activities	Student activities
• Motivates and arouses interest • Builds on students' existing knowledge • Asks questions and encourages answers • Acts as a facilitator	• Listens attentively • Asks questions • Arouses curiosity • Demonstrates activity and advances hypotheses

2. Explore (Explore. Problem Solving. Active Participation)

The exploration stage provides students with a common framework for activities that expose them to current concepts, processes, and skills, as well as conceptual insights. Students may conduct laboratory work, where students apply previously acquired knowledge to generate new ideas and explore questions. Cognitive and physical skills are developed at this stage. During the exploration stage, students actively participate in searching for information, completing practical tasks, observing, and conducting experiments. The teacher's task is to create conditions for independent work, guide students' activities, and provide the necessary assistance in finding solutions. It is important that students not only collect information, but also analyze it and formulate hypotheses.

Teacher's activities	Student activities
• Observes and listens to student interactions • Asks clarifying questions • Provides time for reflection • Encourages collaborative learning	• Participates in activities • Listens and shares ideas • Records observations • Discusses alternatives

3. Explain (Explain. Strategic concepts. Method statement. Discussion of the idea)

After students have conducted research and received their results, the explanation stage begins, when they must explain their conclusions. The explanation stage focuses students' attention on a specific aspect of the research, provides an opportunity to demonstrate their conceptual understanding, skills, or behaviors. Students explain their understanding of the concept. At this stage, the teacher can lead students to a deeper understanding of the topic. The following skills are developed at this stage: cognitive and metacognitive, as well as effective oral and written communication, analysis, and evaluation. The teacher helps to systematize the knowledge gained, explains theoretical aspects, confirms or refutes hypotheses, highlights key points, and helps students formulate clear and complete explanations.

Teacher's activities	Student activities
• Provides definitions and explanations • Listens to students and builds on their ideas • Asks for clarification • Uses existing knowledge to improve the learning process	• Explains in his own words • Applies new concepts • Uses formal terms and definitions • Has a positive impact

4. Elaborate (Deeper Entry. New Problem. Active Participation. Written Statement)

During the elaboration stage, students apply the acquired knowledge in new situations. This stage allows students to expand and deepen their knowledge by solving more complex problems or studying related topics. This helps to develop creative thinking and helps students see the practical relevance of the material being studied. In this stage, skills such as metacognition, effective oral and written communication, as well as curiosity and imagination are developed. The teacher awakens and expands students' conceptual understanding and skills.

Teacher's activities	Student activities
• Promotes application in different contexts • Uses new terms and definitions • Explains and asks questions effectively	• Apply concepts to new scenarios • Expands understanding • Uses formal language and terminology

5. Evaluate (Evaluate. What was learned. Questionnaire period. Control)

At the final stage, both the student's activity and the learning process itself are evaluated. Assessment can be formative (for example, observation of the work process, feedback during assignments) or summative (final tests, projects, assignments). The following skills are developed at this stage: analysis and evaluation. It is important that the assessment not only records the final result, but also encourages students to reflect and self-assess.

Teacher's activities	Student activities
• Observes and evaluates student behavior • Promotes self-esteem • Asks open-ended questions • Provides clear conclusions	• Demonstrates understanding • Evaluates own progress • Answers open-ended questions

The advantages of the 5E model for the educational process include the following:

1. Activation of cognitive activity

The 5E model promotes active learning, in which students become active participants in the educational process. This increases their interest and motivation for learning.

2. Development of critical thinking. Each stage of the model is aimed at developing students' ability to analyze, synthesize, test hypotheses and solve problems in a rational way, thereby developing critical thinking skills.

3. Inclusive approach. The 5E model includes different learning styles and allows each student to work at their own pace, which promotes an inclusive educational process and adapts materials to different learning needs.

4. Preparing for Real-World Learning. By emphasizing inquiry and problem-solving, the model helps students develop real-world skills such as analyzing data, making informed decisions, and designing projects. Applying the 5E Model to Different Subject Areas: Although the 5E Model was originally developed for teaching science, it can be successfully adapted to other subject areas. For example, in the humanities, students can research historical events, analyze literary works, and

develop social projects. In mathematics, they can solve non-standard problems and test hypotheses using a variety of methods.

The 5E learning model has some shortcomings related to the specific nature of each stage. These shortcomings arise from the fact that the model is used as a linear sequence and that each stage is not isolated.

Disadvantages associated with the different stages of the model:

Engage. 1. Partially undermines the process by focusing on the content of the topic. This stage does not involve the teacher giving a lecture, defining terms, or explaining. The goal is to interest or arouse interest and connect it to the current topic.

2. Not enough attention is paid to this stage. In some cases, the engagement stage is not given enough attention, which can lead to students not being actively motivated in the learning process

Explore. 1. Time spent on practical activities. Laboratory studies or practical exercises at this stage can be long.

2. Lack of direct instructions - the teacher guides students to questions based on their research, but the answers are not yet sought.

3. The need to allocate time to clarify hypotheses - students are given time to reflect on the results of the research.

Explain. 1. Teacher-centered. Students explain their understanding of concepts and approaches, and the teacher corrects students' misconceptions.

2. Need for formative assessment: The teacher should ask follow-up questions to support the discussion and conduct formative assessment to determine whether students are ready to begin the developmental phase and whether additional guidance or support is needed.

Evaluate. 1. The complexity of designing assessments that align with the 5E model. It can be difficult to design assessments that effectively measure student understanding of the concepts in the model. 2. Using the model as the basis for a single lesson reduces the effectiveness of the individual steps, reducing the time and opportunity to challenge and reframe these concepts. It is best to use the model for two to three weeks. Then, each step serves as the basis for one or more lessons.

To overcome the shortcomings of the 5E model, we can use the following methods:

- Vary the sequence of activities. Changing activities throughout the lesson increases students' motivation to learn the material and reduces the cognitive load when performing various tasks.

- Use additional tools. For example, the GRASPS tool or the 4C/ID model's learning task system can be used to develop learning tasks and assignments during the research phase.

- Flexible use of the model. Although the 5E model is interpreted only sequentially, sometimes it is necessary to return to the previous cycle before moving on to the next with students. The teacher can move back and forth within the model several times.

- Use non-traditional forms of assessment. These include portfolios, concept maps, physical models and journals, presentations with student self-assessment (reflection).

There is no clear consensus on which non-traditional assessment methods are most effective. Accordingly, we present several options:

• The “green pen” method. The goal is to avoid drawing the student’s attention to errors highlighted with a red pen and to mark the most successful areas with green ink. This can increase self-assessment and motivation.

• Rating system. This system emphasizes competition: students strive to achieve better results than others. Competition allows them to improve their skills, increase self-esteem, and visually see their successes, which is very important for the overall learning process.

• Criteria-based system. Written assignments are assessed based on criteria. Criteria provide the most objective assessment, showing the student where they are achieving high results and where they need to work harder.

• Specification-based assessment. The system is focused on developing skills, has clear assessment criteria, and provides more time and opportunity for feedback.

• Questionnaire and self-assessment. This system allows students to self-analyze and reflect on their progress. Students complete an online questionnaire each week, sharing what they have learned, what they have learned about themselves, what they would like to improve, and how their work is being evaluated.

• Visualization and gamification. This assessment method can take a lot of time and preparation, but its implementation can increase student motivation and provide an opportunity to receive meaningful feedback. The goal is to visually represent the student's journey through a game-like experience.

Conclusion. It is important to remember that it is inappropriate to rely too often on such forms of organizing the learning process, since unconventionality can quickly become conventional, which can lead to students losing interest in the subject. This article analyzes the theoretical and practical aspects of using the 5E model in the educational process. The results of the study showed that the 5E model serves to effectively organize student-centered education, increase students' cognitive activity, and ensure deep and stable mastery of knowledge. The step-by-step structure of the model allows students to develop independent thinking, analyze problem situations, and assess their own knowledge. Also, the implementation of the 5E model in practice has a positive effect on improving the educational process based on modern pedagogical approaches and improving the quality of education.

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MONITORING - AS A TOOL FOR IMPROVING THE EFFICIENCY OF ADVANCED TRAINING OF PEDAGOGICAL PERSONNEL

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Abstract. *This article is dedicated to the disclosure of the fundamentals of monitoring as a tool for increasing the effectiveness of advanced training of teaching staff in the vocational education system. The article examines the issues of monitoring the effectiveness of advanced training of teaching staff and substantiates the relationship between monitoring and improving the effectiveness of the educational process.*
Keywords: *monitoring, education, advanced training, effectiveness of advanced training, pedagogical monitoring, development strategy, information, monitoring study.*

Introduction

On the basis of the Concept of Development of the Higher Education System of the Republic of Uzbekistan until 2030 (№-UP-5847 dated 8.10.2019), the Law of the Republic of Uzbekistan "On Education" (№ЗРУ-637 dated 24.09.2020) and a number of programs and strategies aimed at the development of the education system as a whole (Strategies for the Development of New Uzbekistan for 2022 - 2026 (№UP-60 dated 28.01.2022), Strategy "Uzbekistan-2030" (№UP-158 of 11.09.2023) and other targeted programs for the development of education), key directions of improving the efficiency of educational institutions are highlighted. Among them, special attention is paid to ensuring a high level of quality and efficiency of education and creating conditions for its accessibility.

Monitoring the effectiveness of education is recognized as one of the most important tools for achieving these goals and objectives. It involves the development of clear criteria and methods for assessing the educational process, the organization of regular monitoring of the results of training, education and personal growth of students, the collection of reliable information on the course of the educational process and compliance with its state requirements and the demands of modern society. Modern trends in updating the content of education, the introduction of innovative methods and a variety of forms of educational organizations make the modernization of the process of control and pedagogical research relevant. Thus, the task of building a system for monitoring the improvement of the effectiveness of education becomes a central problem in the management of the modern system of vocational education. This aspect becomes especially important in the light of the development of modern training approaches, characterized by a focus on the formation of competencies and the implementation of an activity approach in training. Achieving compliance with the new requirements requires the introduction of appropriate evaluation criteria and effective measurement procedures.

As we noted above, in the modern world the importance of education is growing as the most important factor in the formation of a new quality not only of the economy, but also of society as a whole. Education is becoming an area of activity open to society, which is necessary to improve the

quality of human capital. Today, obtaining high-quality education largely determines the demand for a specialist in the labor market, his competitiveness in rapidly changing socio-economic conditions. Ultimately, the quality of education is crucial for building a personal professional development trajectory of a specialist. Only an independent and creative professional, an active subject in the educational services market, having an individual style of professional activity, able to manage his intellectual potential, constantly developing his pedagogical competence, capable of implementing modern ideas.

Thus, the urgent issue today is to improve the educational and professional level of teachers and evaluate its results with the help of monitoring research. In professional pedagogy, some system-forming elements of monitoring were reflected in the works of Bespalko V.P., Golish L.V., Akhmetova K.I., Mayorova A.N., Silina S.N., Simonov V.P. [1-5] and other authors. The study found that the achievement of the quality of the advanced training process is inextricably linked with the development and implementation of monitoring of its results. Based on the existing research in the field of monitoring theory and methodology, taking into account different interpretations of the concepts of "monitoring" and "monitoring the effectiveness of the advanced training process", we have formulated their working definitions.

Monitoring of the education system is a systematic standardized observation of the state of education and the dynamics of changes in its results, the conditions for the implementation of educational activities, the contingent of students, the educational and extracurricular achievements of students, the professional achievements of graduates of organizations engaged in educational activities, the state of the network of organizations carrying out educational activities. Monitoring is carried out for the purpose of information support for the development and implementation of the state policy of Uzbekistan in the field of education, continuous systematic analysis and assessment of the state and prospects for the development of education (including in terms of the effectiveness of the activities of organizations engaged in educational activities), strengthening the effectiveness of the functioning of the educational system by improving the quality of management decisions made for it, as well as in order to identify violations of the requirements of the legislation on education.

Monitoring the effectiveness of education is a system of collecting, processing, storing and disseminating information on the activities of the education system, as well as on the satisfaction of internal and external consumers of educational services. Based on this, we can accurately assert that monitoring the effectiveness of advanced training of pedagogical personnel is a scientifically based method of continuous, control and evaluation, diagnostic and prognostic tracking of the progress of the process of advanced training and trends in its development. Its purpose is a strictly time-defined assessment and fixation of the quality of the advanced training process, carried out in comparison with the regulatory parameters of state requirements by means of special tools.

The substantive side of monitoring the effectiveness of advanced training of pedagogical personnel can be represented in two aspects:

- firstly, as the content of research activities at different stages of monitoring: definition of the goals of tracking advanced training of teachers; analysis of the content of advanced training programs; definition of criteria, indicators, indicators, methods of assessing the formation of demanded competence, as well as pedagogical conditions affecting its formation; design of the research situation; implementation of research results into practice; parallel conduct of longitudinal studies; adjustment of the content of advanced training and setting goals for the implementation of new development vectors;

• secondly, as the content of pedagogical and managerial conditions implemented in the course of advanced training. These conditions include: theoretical module of advanced training, practical module, technical and technological content of advanced training and scientific and methodological support of educational activities. It should be noted that the actual implementation of the theoretical and practical modules of advanced training can be carried out during the implementation of the invariant and variational part of the modular advanced training program on courses in the advanced training system.

The substantive aspect of monitoring determines the specific structure of the information field: the object of study, the levels of the object's study, the subject of monitoring, sources of information, methods of monitoring research, means and technologies of monitoring research, forms of providing results and management decision. The procedural side of monitoring the quality of advanced training of pedagogical personnel is presented:

• in actions at each stage of monitoring;

• in actions related to the construction of modules, tools, technologies for the implementation of pedagogical conditions.

It is the structuring of information and timely analysis of the dynamics and state of the educational process at advanced training courses that allow to ensure its quality and thereby improve the quality of professional training of pedagogical personnel. So, monitoring, in essence, is a special phenomenon, it is multidimensional, continuous, objective, integrative. In our opinion, monitoring studies of the quality of the advanced training process perform the following functions:

• informational - regular in accordance with the program and schedule of tracking the progress (results) of the advanced training process on the basis of their constant recording, evaluation and compliance with the specified criteria;

- organizational - targeted collection, generalization, systematization and analysis of information for making decisions on the optimal choice of educational goals and means of their solution or correction of the tasks performed, or forecasting trends in the development of the system of advanced training;

• control and evaluation - operational control and evaluation of the effectiveness of the pedagogical actions carried out and the completeness of the implementation of the ultimate goals of the system of advanced training of pedagogical personnel;

• training - disclosure of the causes of shortcomings in pedagogical work, identification of specific ways and means of ensuring the quality of the process of advanced training; teach teachers a deep understanding of the tasks facing them, the ability to persistently and consistently implement them in practice, deeply analyze and self-critically evaluate its results;

• developmental - broadening the horizons of teachers, the growth of general culture, the development of intellectual, moral qualities.

• correctional - prompt search and clarification of the reasons for the current situation and, if necessary, correction of the tasks performed;

• diagnostic and prognostic - timely identification of changes occurring in the process of advanced training, in particular in the system of advanced training of pedagogical personnel, in general, making a pedagogical diagnosis, establishing cause-and-effect relationships and prompt forecasting of their further development.

In the procedural aspect, the implementation of these functions is carried out operationally, that is, through the sequential execution of "monitoring operations" that form a certain algorithm. We present it schematically in Fig. 1.

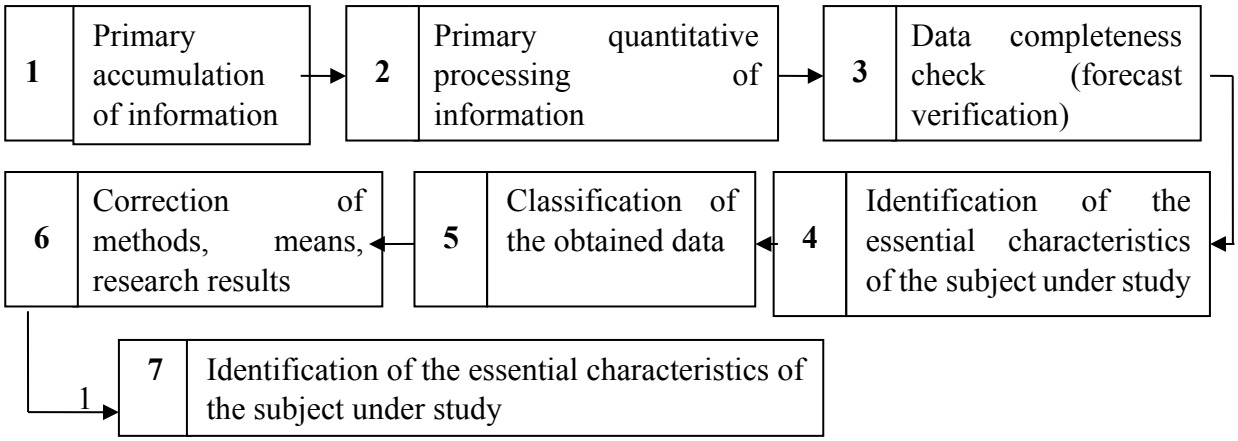


Fig. 1. Pedagogical monitoring algorithm

Based on the conducted research, we will set out our own interpretation of the key concepts of the study and formulate their working definitions. In our understanding, "monitoring" is a multidimensional, integral and systemic concept. Pedagogical monitoring implies long-term and systematic, scientifically based, specially organized observation and tracking of trends in the system and in the object of advanced training itself in order to obtain information for comparing them with a given standard, their control, evaluation, and forecast, as well as management decision-making.

The effectiveness of the advanced training process is determined by the fact that its results must comply with the goals of advanced training and the final result set by the regulatory documents. Monitoring the effectiveness of the advanced training process is a scientifically based method of continuous, control and evaluation, diagnostic and prognostic monitoring of the progress of the advanced training process and trends in its development. Its purpose is a strictly time-defined assessment and recording of the effectiveness of the advanced training process, carried out in comparison with the regulatory parameters of state requirements by means of special tools. Monitoring and evaluation technology is an orderly set of optimal methods and means of pedagogical monitoring that instrumentally ensure the implementation of the goal of monitoring and the achievement of certain results in these conditions for making managerial and pedagogical decisions. Monitoring the effectiveness of the advanced training process performs the following functions:

• informational - regular in accordance with the program and schedule of tracking the progress (results) of the advanced training process on the basis of their constant recording, evaluation and compliance with the specified criteria;

- organizational - targeted collection, generalization, systematization and analysis of information for making decisions on the optimal choice of educational goals and means of their solution or correction of the tasks performed, or forecasting trends in the development of the system of advanced training;

- control and evaluation - operational control and evaluation of the effectiveness of the pedagogical actions carried out and the completeness of the implementation of the final goals of the system of advanced training of pedagogical personnel of the SSPO;

• educational - disclosure of the causes of shortcomings in pedagogical work, outline of specific ways and means of ensuring the effectiveness of the process of advanced training; teach teachers a deep understanding of the tasks facing them, the ability to persistently and consistently implement them in practice, deeply analyze and self-critically evaluate its results;

• developmental - broadening the horizons of teachers, the growth of general culture, the development of intellectual, moral qualities.

• correctional - prompt search and clarification of the reasons for the current situation and, if necessary, correction of the tasks performed;

• diagnostic and prognostic - timely identification of changes occurring in the process of advanced training, in particular in the system of advanced training of pedagogical personnel of the SSPO, in general, making a pedagogical diagnosis, establishing causal relationships and promptly forecasting their further development.

Successful achievement of the goal and solution of tasks within an educational institution are possible only if the principles of monitoring organization are implemented. Let's briefly consider their essence. Purposefulness - consists in the exact choice of the purpose of monitoring, in order to direct all the work on monitoring the process of advanced training to solve the main tasks facing the staff of the educational institution and to have an effective impact on its activities.

Comprehensiveness - involves the coverage of all aspects of educational work, all areas of the advanced training process, all categories of pedagogical personnel. Objectivity is the determination of the real state of the advanced training system, the exact picture of pedagogical phenomena, their fundamental assessment. Systematic - means a constant, systematic, logically consistent study of the state of the process of advanced training, the work of teachers and students throughout the process of advanced training (one month), allowing to track the growth of pedagogical skills of teachers, improving the effectiveness of the process of advanced training and knowledge of students.

Effectiveness is its effectiveness, efficiency, timely adoption of management and pedagogical decisions during monitoring and based on its results, prompt implementation of these decisions. Effectiveness - is achieved by an in-depth analysis of the identified shortcomings, objective conclusions, constructive proposals, thoughtful follow-up work aimed at correcting the shortcomings. Publicity is one of the important measures of public influence. Monitoring is carried out openly. The terms and objects of monitoring, as well as the objectives of monitoring, are announced in advance. All its subjects participate in the discussion of the monitoring results: both inspectors, experts, listeners, and those teachers whose work is analyzed.

Conclusion

Thus, it can be argued that all functions and principles of monitoring are subordinated to one common goal - to improve the effectiveness of the process of advanced training of pedagogical personnel and are aimed at providing a scientific approach in the management of the educational process.

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NEW PEDAGOGICAL APPROACHES IN WORKING WITH INCLUSIVE AND STAGED CLASSES

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Abstract. *To study the content and essence of normative and regulatory laws and by-laws adopted to ensure that students with special educational needs receive equal education as their healthy peers, and the theoretical and practical significance of teaching inclusive education in primary and higher education and ways to organize joint education of students in differentiated classes, regardless of their physical, intellectual, social, emotional, language, and other characteristics. Support through modern pedagogical approaches is the main goal of socializing children. The implementation of ways to support inclusive education through differentiated, differentiated approaches through established norms and documents is the demand of the day. This article shows that in inclusive education, all students are provided with the same educational environment, with the aim of meeting each individual need, coherence, purposefulness, decision-making, the main role of special educators in organizing this education, as well as opinions and discussions about differentiated education are expressed.*

Keywords: *project, team, student, inclusive education, differential, approach, classroom, pedagogical views, socialization, documents, demand.*

Introduction

As you know, we have set ourselves the principle
that the state serves the people.
You are also a worthy member of our society.
We will create all conditions for this area.
Every person in Uzbekistan is valuable to me.
President of the Republic of Uzbekistan
Sh.M. Mirziyoyev

The process of development of society is associated with the revision of the education system. Changes in society also require adjustments in the direction of education and upbringing. The use of new forms and methods of teaching is gradually becoming a progressive force in the development of society. Based on this, innovation is of great importance in the restructuring of society. Innovation is a continuous process, an integral part of pedagogical activity. On the basis of innovative pedagogical views, today our state and society are carrying out reforms aimed at fully ensuring the rights of children in the field of education and their socialization.
A number of normative and regulatory laws and by-laws are being adopted to ensure that students with special educational needs receive equal education as their healthy peers, including: Constitution of the Republic of Uzbekistan, adopted on April 30, 2023, September 23, 2020, Law of the Republic of Uzbekistan "On Education" No. ЗРУК-637, January 7, 2008, The Law of the Republic of Uzbekistan No. URQ-139 "On Guarantees of the Rights of the Child", the Decree of the President of the Republic of Uzbekistan "On Approval of the Concept for the Development of

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Also, the Resolution of the Cabinet of Ministers of the Republic of Uzbekistan No. 638 dated October 12, 2021 "On approval of regulatory legal acts on the education of children with special educational needs" was adopted. Resolution No. 740 of the Cabinet of Ministers of November 24, 2025, introduced many changes in the field of monthly salaries in the education sector. In particular: The procedure for dividing the staff units "Special Pedagogue" and "Assistant Teacher (Assistant Teacher)" in general education schools has been clearly defined; Special educators will be paid a 50 percent bonus compared to their official salary; For teaching students who are taught individually at home, including 2 or more students of the same age and at the same address, teachers of general education schools will be paid a monthly travel allowance in the amount of one time the base calculation amount; The salary of a paid position of "assistant teacher" is calculated by multiplying the minimum wage by a coefficient of 2.470.

The purpose and objectives of the topic:

Teaching inclusive education in primary and secondary education, that is, ways to organize the education of students together, regardless of their physical, intellectual, social, emotional, language and other characteristics. Inclusive education (English: inclusion - inclusion, inclusion in education, joint education) has the meaning. It is a form of education in which every person, regardless of their physical and intellectual, social, emotional and linguistic background, as well as race and color, is given the opportunity to study in general education institutions. Supporting the needs for inclusive education and the advantages of this form of education through modern pedagogical approaches based on adopted regulatory documents is the main goal of the socialization of children.

The implementation of ways to support inclusive education through differentiated, differentiated approaches through established norms and documents is the demand of the day. Exclusion - children with disabilities who are not included in education, that is, outside of education. Such children are not involved in education and their rights to education are not automatically ensured. Segregation - separating children with special needs from general education and providing them with education in special schools and boarding schools. Integration - organizing separate classes in general education schools for children with special needs. Inclusion - children with special needs studying in the same class with other children in general education schools.

Relevance of the topic: These decrees and resolutions identify the need to find solutions to a number of problems facing the education system:

1. The shallowness of the regulatory framework in the field of inclusive education.

2. The high need for training qualified teachers for the inclusive education system and continuous development of their inclusive competence.

3. Ensuring the continuity and consistency of inclusive education in preschool educational organizations, general secondary and secondary specialized education, vocational education, and higher education systems. The high need to strengthen the material and technical base of institutions where inclusive education is introduced;

4. Insufficient scientific and methodological base for teachers and educators in inclusive educational institutions, that is, the necessary literature, methodological manuals.

5. High level of provision of a safe inclusive educational environment, etc. Solving these problems creates the basis for the successful process of education, upbringing, development, and socialization of each child with individual educational needs. In particular, the training of pedagogical personnel is one of the main issues.

Because it is precisely because of the human factor that the education system moves and develops or, conversely, faces a crisis. The implementation of inclusive education in practice automatically creates an increase in the demands placed on the activities of teachers and educators, the need to expand their functional responsibilities and professional qualifications. Traditional knowledge and skills alone are not enough in this type of education. Working with children in need of special assistance requires special professional competence from teachers and educators, that is, inclusive competence.

It should be noted that in order to form inclusive competence, ***a teacher must possess such important qualities as empathy, reflection, mobility and flexibility, the ability to collaborate, sensitivity to the needs of learners, sociability, and self-management skills.***

Expected result: Works taking into account the psychological aspects of education for students with special educational needs. Inclusive education is a form of education in which every individual, regardless of physical and intellectual, social, emotional and linguistic background, as well as race and color, is given the opportunity to study in general education institutions. To create a barrier-free, adapted educational environment for students with special educational needs at school, using special tools and methods, involving special educators, organizing differentiated classes, and providing quality general secondary education that serves the effective adaptation and full integration of children into society. Inclusive education is an educational process leading to the development of an inclusive society, which is a historical process that goes through exclusion, segregation, and integration.

Research materials and methodology

Specific features of the inclusive education system in Uzbekistan

The strategic goal of state education policy - to increase the availability of quality education that meets the requirements of innovative economic development, the modern needs of society and each citizen - is associated with creating an educational environment that ensures the successful socialization of all students, regardless of their psychophysical condition and development.

Inclusive education is a process of education and upbringing in which all children, regardless of their physical, mental, intellectual and other characteristics, are included in the general education system. They study with their non-disabled peers in mainstream schools in the community, taking into account their special educational needs. Including or encompassing all services, facilities or objects that are usually expected or required. Specialised education - children with physical and mental disabilities in special (correctional) institutions of types I-VIII; integrated education - children in special classes (groups) in educational institutions; inclusive education - when children with special educational needs are taught in the same classroom as ordinary

children. The process of developing general education, which provides for the accessibility of education for all, including children with disabilities.

Chapter 7, paragraph 44 of Resolution No. 638 of the Cabinet of Ministers states the idea of organizing a comprehensive examination of students and the activities of a psychological-medical-pedagogical council.

Statistical data: Today, more than 15% of the world's population is made up of people with disabilities. Taking into account their families, friends and loved ones, we can say that disability problems affect 50% of the population. There are 810,000 people with disabilities in Uzbekistan. Today, they are disadvantaged, facing all forms of discrimination: at school, at work and in family life. Models of disability: 1. Historical or religious-moral model; 2. Medical model; 3. Social model.

"Inclusive education is the education of children with disabilities, mental and physical developmental disorders, together with their healthy (normative) peers in general education institutions." Inclusive education, which is rapidly entering the practice of general education institutions, poses many complex issues and new tasks.

Requirements for inclusive education: Equality of opportunity; Barrier-free environment; Systematicity; Availability of a resource teacher; Accurate diagnosis; Public awareness.

The regulatory and legal framework of inclusive education - in accordance with the legislation of the Republic of Uzbekistan, children with special educational needs should be educated in educational organizations according to the general education curriculum and an individual (individual) program. The regulatory and legal framework of special and inclusive education - international laws, the legislative framework of the Republic of Uzbekistan, documents containing the regulatory framework for special and inclusive education.

Search results

The structure of inclusive education in Uzbekistan: inclusive education - Preschool educational institutions, general education schools, resource centers, lyceums, colleges, higher educational institutions; Rehabilitation centers Logopoints. Educational and methodological support for the activities of teachers working in inclusive education: Development of methodological recommendations; Conducting practical seminars, master classes, webinars, establishing systematic cooperation with educators; Exchange of experience between teachers and educators of special and general education organizations; Analysis and generalization of the best educational practices. Scientific and methodological support of the educational process in inclusive education: Development of educational and methodological support - State standards, curricula, curricula, educational and methodological guidelines, Methodological recommendations and manuals. Recommendations for including children with special needs in inclusive education: Accept students with disabilities as much as possible; Include them in the same activities as all children, with a separate approach; Involve children with special educational needs in group work using an individual approach; It is necessary to create special educational programs for children with special educational needs using ICT in the educational process.

The project "From Inclusive Education to an Inclusive Society" was implemented at the competition for state social orders announced by the Public Fund for Support of Non-Governmental Non-Profit Organizations and Other Civil Society Institutions under the Oliy Majlis of the Republic of Uzbekistan. The purpose of this project is to develop a mechanism for inclusive education for children with Down syndrome and autism who have undergone cochlear

implantation surgery, and to create psychological and methodological training technologies for working with children.

Target groups of the project - children with Down syndrome; children who have undergone cochlear implantation surgery; children with autism spectrum disorders. 3 different mechanisms for introducing inclusion in general education schools for children with Down syndrome and autism spectrum disorders were proposed. Mechanism I Children of this type study in the same class as their healthy peers, but educational, correctional and developmental goals and tasks are implemented on the basis of a special and appropriate curriculum, an individually structured program and didactic support, and the child is necessarily accompanied by a special educator. 3 - mechanism (social inclusion). Children of this type receive education in a correctional class organized at a general education school, but in some subjects (for example, music, visual arts, physical education, technology, natural science) it is recommended to participate in the lessons of these subjects with healthy peers in the classroom with the accompaniment of a special educator, and in school and extracurricular activities they are together with their normally developing peers in the school community. Stages of involving children with KI, Down and autistic symptoms in inclusive education:

Initial stage - 1. Organization of the learning environment. 2. Use of a visual table. 3. Priming (Priming (priming effect, fixed setting)) - in psychology, it represents a hidden memory mechanism that provides an unconscious and involuntary influence of some stimuli on the processing of subsequent stimuli. Priming manifests itself in a change in the speed or accuracy of responses to subsequent stimuli or in the spontaneous increase in the first stimulus under appropriate conditions. In this case, it is necessary to distinguish between the effect itself, in fact, priming, and the resulting changes in the speed or efficiency of stimulus processing, the so-called priming effects.

Disputes

The role and importance of collaborative pedagogy in working with inclusive and differentiated classes in pedagogical activity

Article 36 of the Law of the Republic of Uzbekistan "On Education", approved on September 23, 2020, states: "Experimental and innovative activities in the field of education are carried out with the aim of modernizing education and are aimed at developing new educational technologies and resources, testing them and introducing them into the educational process." And we will achieve this through innovations in education. One of the important requirements for teachers and educators is to teach young people in inclusive and differentiated classes to think independently through a deep understanding and application of innovations in the field of education. Developing practical foundations for the use of modern pedagogical and innovative technologies in the organization of the educational process and effective ways to use them is one of the urgent issues facing the education system. In implementing these works, it is of particular importance that teachers of continuing education, especially teachers and special educators teaching inclusive classes, have sufficient professional qualifications, work on themselves, and be aware of the best practices of pedagogy. In this regard, it is important to know the essence and ideas of the views of cooperative pedagogy and use them. The ideas of cooperative pedagogy are today embedded in the content of pedagogical technologies and form the basis of the “21st Century Education Concept”. Cooperative pedagogy is integral and interconnected with humanistic pedagogy. Cooperative pedagogy has long been used in the education systems of developed countries.

In the research of Simon Lvovich Soloveitchik, one of the founders of the idea of cooperative pedagogy, a new approach to the issue of upbringing is emerging, in which upbringing begins to be expressed not as some kind of influence of the educator on the child, but as an open relationship between the teacher and the student.

Cooperative pedagogy is close to “creative pedagogy” in its “creativity” nature. According to pedagogical innovators, cooperative pedagogy should accept any child as a natural child. In this case, the teacher helps the child to maintain his individuality and awakens the motivation for his intellectual and moral development. The following can be cited as the main ideas of cooperative pedagogy:

- teaching the child in the zone of proximal development:
- teaching without coercion:
- teaching based on basic words, schemes, symbols:
- the idea of progression:
- the idea of large blocks:
- the idea of free choice:
- the idea of dialogic thinking:
- the idea of the intellectual environment of the classroom:
- the idea of cooperative activity of students and teachers:
- the idea of the voluntariness of leisure activities.

Cooperative educational technology aims to form a worldview based on the development of intellectual, spiritual-moral and physical abilities, interests, and motivations in students with health and special educational needs.

Cooperative pedagogy is an independent pedagogical concept, the main result of which is the achievement of the intended goal in the cooperation of the student and the teacher. Cooperative pedagogy is an education that represents the joint mastering of knowledge, mutual development, and the joint organization of the “student-student(s)”, “pedagogue-student(s)” relationship during the learning process.

The main idea of cooperative pedagogy is to complete educational tasks in a team, small groups or pairs together, in cooperation with each other. "Cooperative pedagogy" is considered an educational technology according to its level of application: general pedagogical, according to its philosophical foundations: humanistic, according to its approach to the child: personal-humanistic, subject-subject (cooperation), and according to the application of methods: problem-research, creative, dialogic, and game-based.

As principles of cooperative learning technology:

- mutual unity of members of a pair and small group;
- responsibility of each member of a pair and small group for personal and group success;
- organization of cooperative learning activities in a small group;
- general assessment of group and team work.

As signs of cooperative learning technology, we can indicate the following:

- attention to the student's personality, individuality;
- development of independent and critical thinking in students;
- ensuring the emergence of a positive attitude towards the teacher and peers;
- development of cultural communication skills in students;
- creation of an environment based on cooperation and mutual equality.

Conclusion. From a pedagogical point of view, cooperation contributes to the formation and manifestation of new qualitative changes in the activities of the subjects of the educational process. An important aspect of pedagogical cooperation is that it serves to harmonize the activities of the subjects of the educational process, both inclusive and differentiated classes, as well as healthy children. In the process of pedagogical cooperation, the activities of the teacher and the student are harmonized, acquire a creative character, which requires taking into account each specific aspect of the activities of the subjects of the educational process.

Cooperation in the "teacher-student" relationship is organized on the basis of the idea of a joint analysis of the course and results of this activity, the socialization of the child, sincerity to each other in the spiritual world, strong mutual understanding, and the joint developmental activity of adults and children. In the pedagogical process in traditional education, the participation of the teacher as a subject and the student as an object changes, and the student-student participates as a subject of activity. The "teacher-student" relationship is realized in such types of cooperation as joint participation, joint care, joint creation, and joint management.

Technologies for developing inclusive education as part of updating educational content Inclusive education is a process of education and upbringing in which all children, regardless of their physical, mental, intellectual and other characteristics, are included in the general education system. They study with their peers without disabilities, taking into account their special educational needs, in mainstream schools in society: including or covering all the services, means or objects that are usually expected or required; differentiated education is children with disabilities in special (correctional) institutions of types I-VIII; integrated education is children in special classes (groups) in educational institutions; the process of developing general education, which provides for the accessibility of education for all, including children with disabilities; inclusive education is when children with special educational needs are educated in a classroom with ordinary children.

It is necessary to pay attention to the strategic stages of engagement in inclusive education:

1. Stages of search and engagement.
2. Stages of dealing with children with special needs.
3. Stages of rehabilitation.
4. Stages of integration.

Use of interactive technologies - Children with disabilities are usually not encouraged to learn. But information technologies can solve this problem. Bright colors, movement, sound effects - these are factors that keep the child's attention for a long time, help to make the learning process more conscious. The use of interactive technologies in the educational process, along with traditional teaching methods, significantly increases the effectiveness of education. For NBB, an interactive whiteboard is a visual tool, along with sound and video effects.

Using a "magic" pen and pointer not only develops the child's logic, creative thinking, motor skills and coordination, but also allows him to go back, see where mistakes were made, analyze his work.

The main distinguishing feature of a multimedia interactive whiteboard is the ability to control objects by touching the surface of the whiteboard - move them, increase or decrease their size, rotate, underline with a marker, play sound, video, launch WEB pages, delete or clone them.

Creating a successful situation, minimal fatigue, increasing interest in learning are clear indicators of the effectiveness of using interactive equipment in school. An interactive whiteboard

will become an indispensable assistant in the classroom, a great addition to the vocabulary and an assistant in learning. This allows for a wider use of visual aids in studying the material, so the presented material will be understandable to students.

Features of each interactive form in inclusive education –

Creative task: "A creative task (especially practical and close to the student's life) gives meaning to learning, motivates students. The uncertainty of the answer and the ability to find your own "right" solution, based on your personal experience and the experience of your colleague, friend, allow you to create a basis for cooperation, joint learning, and dialogue of all participants.

Working in small groups – this type of training allows the student to "practice cooperation, interpersonal communication skills": "active listening, developing a common opinion, resolving disagreements that arise". The teacher should form in the students' ideas about the rules of working in a group. This can be done, in particular, with the help of a memo containing the following points: "be honest with your comrades, work as much as you can; listen carefully, without interrupting, to each member of the group; speak briefly, clearly so that everyone can speak; support the other, despite intellectual differences.

Role-playing **-** The purpose of role-playing games is a method of teaching, developing and educating schoolchildren in an interesting, playful, creative way. "In role-playing games, real-life situations are staged and various behavioral models are played, then discussed and recommendations are given. The goals of developing communication skills, behavior and managing emotions are achieved."

Mini-lecture **-** A mini-lecture is a short, clear speech that provides an explanation of principles, models, theoretical positions, research results, and considerations that may be important for the current educational needs of students.

Lecture rules

1) if the theoretical material is presented according to the principle of "from general to specific", then the principle of scientific specificity should be used (for reference to authoritative sources);

2) the teacher should present all the material in a convenient way, taking into account the age characteristics of the students;

3) after the lecture, the student must have feedback;

4) the lecture material must have a practical orientation.

PAMN-formula: The PAMN-formula (position - basis - example - result) is a rapidly developing technique that allows you to activate student activity. The PAMN formula is actively used in organizing disputes and discussions, contributing to the development of students' not only analytical skills, but also the ability to reason, independently find confirmation of their assumptions and prove their point of view.

Training - this form of interactive education is aimed at developing "skills and abilities in any field through the performance of sequential tasks, actions or games aimed at achieving and developing the necessary skills."

Block-modular training is one of the main technologies that ensure the formation of students' competencies in the classroom. The teacher takes an individual approach to students, which leads to an increase in interest in the subject.

A project is a set of search, research, calculation, graphic and other types of work carried out by students independently, but under the guidance of a teacher, in order to solve an important

problem, either practically or theoretically. The role of the teacher in interactive education - In interactive education, teachers not only perform educational and professional roles, but they also

- designers,
- programmers,
- diagnosticians,
- researchers,
- organizers,
- managers,
- innovators,
- teachers and
- consultants.

Therefore, teachers are both the organizers of the entire educational process and themselves, communication partners for the student. An interactive teacher is a teacher who respects all students, listens to them and helps them solve problems independently. The teacher's posture and behavior are given the same importance, as is the teacher's work with children. An interactive teacher is a teacher who knows and understands some basic principles related to how a child learns, and at the same time can use different forms and methods of teaching to help all children.

The direct participants in interactive education are, of course, teachers and students, but school principals and specialists (teachers, psychologists, defectologists, speech therapists, tutors) also play an important role in organizing interactive education. Thus, the researchers included school principals, educational managers, and teachers in the questionnaire and questionnaire. To the question “To what extent is interactive education used in educational work with school-age children?”, the participants in the training gave the following answers:

D-1: It is easier for teachers to work in a traditional way, so they rarely practice interactive teaching.

E-2: Interactive teaching is carried out by more experienced teachers who know how to use this type of teaching.

D-5: Interactive teaching is more common in preschool institutions than in the first grade of primary school.

D-7: Some teachers, despite their training and qualifications, do not use interactive teaching.

D-8: Interactive teaching is not used sufficiently in our schools, firstly, the curricula do not leave room for interactive teaching; secondly, school textbooks are more adapted to the traditional teaching style.

D-9: Working in groups requires special tasks developed separately for each group, and therefore it is difficult for teachers to develop various tasks.

Often, the lesson plan does not allow for the use of interactive educational technologies.

Analysis of the survey results allowed us to develop the following recommendations for teachers.

- Any topic can be interactive, but it takes more time to prepare for the lesson;
- The interactive teaching method should not be considered and studied only when it is a research goal;
- It is necessary to organize joint meetings with teachers and hold open conversations and discussions on the importance of interactive teaching;

- It is necessary for teachers to visit each other's classes and exchange experiences;
- It is necessary to develop instructions for the teacher
- Thus, interactive teaching has many advantages over the traditional teaching method, and therefore it should be used more often by teachers.

Factors ensuring the effectiveness of inclusive and differentiated education

Today, preparing the younger generation for life in modern society requires determining the psychological, emotional, physical and social readiness of the student at different stages of education in general education institutions. These requirements can be implemented with a differentiated approach to the goals and content of correction, that is, the qualitative level of diversification through a stratified (differential) approach to students creates the need for a different system. This situation leads to the strengthening and complexity of differential preparation according to the student's abilities, interests, and mastery - a global trend of the modern school.

The strategic goal of state education policy - to increase the availability of quality education that meets the requirements of innovative economic development, the modern needs of society and each citizen - is associated with creating an educational environment that ensures the successful socialization of all students, regardless of their psychophysical condition and development.

Consilium (Latin consilium - council) means. Pedagogical consilium is a type of expert assessment method; it involves a collective discussion of learning outcomes according to a specific program and general principles, a collective assessment of certain aspects of the personality, and the identification of the causes of deviations that occurred in the process of forming certain characteristics of personality traits. A council is one of the methods of work of a psychological service, a collective decision of persons participating in educational work on the formation of a pedagogical diagnosis and the development of measures of pedagogical influence on the student. By a council we mean a constantly working, coordinated group of specialists united by common goals, implementing one or another strategy for monitoring the child. In such a team, it is necessary: based on the order of the school principal, a Council is formed, consisting of the following: Deputy Director for Academic Affairs (Chairman of the Council); Deputy Director for Spiritual and Educational Affairs (Deputy Chairman of the Council); teachers of inclusive education classes and primary basic correctional classes; psychologist; special educator; tutor; pediatrician (psychoneurologist), nurse.

Also, the school principal and his deputy for educational affairs shall supervise the timely conduct of classes and the implementation of curricula; specialists who are not available at the school may be involved in the work of the Council on a contractual basis; parents of students or their substitutes may participate in Council meetings; the Council shall hold meetings at least once a quarter of the academic year on the development of students, implementation of curricula, health and psychological state; The requirements in accordance with the content and essence of paragraphs 43-48, such as the Council shall submit a proposal to the psychological-medical-pedagogical commission to remove a student from an inclusive education class or primary correctional class based on the student's learning, implementation of the curriculum, health, and psychological state, are also coherently emphasized and qualified with analytical concepts in this chapter. The ability of the entire pedagogical team to understand and comprehend the essence of the existing problems of students further strengthens the resulting effectiveness. Thus, the pedagogical council, by its very nature, is considered the most important section of mental health

work, and if it is thoroughly thought out, planned and implemented by a qualified psychologist and special educator, it allows for the solution of many problems.

In the cases I have observed, the listeners are advised to read Chapter 5 of this Resolution: Paragraphs 20, 21, 26, 27, 28, 31 on the organization of the educational process in inclusive education classes and primary basic correctional classes; Chapter 6: Paragraphs 34, 36, 38, 40, 41, 42 on the activities of pedagogical staff and cooperation with parents; It is clear that we need to be more consistent and united in our approach to ensuring the implementation of Chapter 8: Financing and Logistics, paragraphs 52, 53, 54; and Chapter 9: Final Provisions, paragraphs 55 and 58.

The role of the pedagogical team and special educators in the education of students studying in inclusive classes

The tasks of the pedagogical team working with students with special educational needs, in addition to the tasks that must be performed by the above-listed teachers, require responsibility for performing additional tasks. The pedagogical team working with children with special educational needs is a team consisting of special educators, defectologists, speech therapists, psychologists and other specialists, who aim to provide quality education and upbringing to children with disabilities or various developmental limitations.

Defectologist - studies the mental or physical development of a child, develops correctional programs. Speech therapist - helps children with speech problems, identifies speech defects and conducts classes aimed at correcting (correcting). Psychologist - studies child psychology, analyzes the mental state of children, forms motivation, helps solve emotional problems. Class teacher or educator - organizes daily educational work. Special educator - assists the main teacher in an inclusive classroom, conducts extracurricular activities with students with special educational needs.

Correctional and developmental practical exercises (sample)

These exercises can be used by a teacher, defectologist, speech therapist, psychologist or parents when working with children with special educational needs in the areas of speech, movement, attention, memory, sensory-emotional areas.

1. Exercises that develop attention and perception

Exercise: "Find the difference"

Materials: 2 similar but different pictures (with 10 differences)

Task: The child finds the differences between the two pictures.

Purpose: To develop concentration, thinking.

Exercise: "Where is it hiding?"

Materials: 5-6 objects are placed on the table, then the top is covered.

Task: After the cover is closed, the child answers the question "Which object is missing?"

Purpose: To develop visual memory and observation.

2. Development of speech and phonemic hearing

Exercise: "Find the sound in the word"

Task: The child hears and says the letters "a", "s", "m" from the word spoken by the teacher.

Objective: To develop phonemic perception, to teach to distinguish sounds.

Exercise: "Word chain"

Task: The teacher says "bread", the child says a word starting with the last letter of this word - "n" ("cannabis", "what", etc.).

Objective: To increase vocabulary, to develop logical speech.

3. Sensory development exercises (sensory integration)

Exercise: "Touch"

Materials: Soft, rough, cold, warm, round, oblong objects

Task: The child closes his eyes and identifies the given object by touch.

Goal: Develop sensory sensitivity and sensory differential perception.

Exercise: "Let's draw in the sand"

Materials: Sand tray, stick

Task: Letters, shapes, drawing

Goal: Develop tactile perception, motor skills and imagination.

4. Development of fine and gross motor skills

Exercise: "Let's make a picture from shapes"

Materials: Cut geometric figures of different colors and shapes (circle, square, triangle).

Task: The child creates a house, tree, man and other objects from these figures.

Goal: Develop motor skills, coordination and creative thinking.

Exercise: "Let's string"

Materials: Large beads, thread

Task: The child strings beads on a thread according to their color or shape.

Goal: Develop fine motor skills and coordination.

Conclusion and recommendations

Methodological recommendations and advice

- The role of parents in inclusive education: inclusive education is an approach ensures that children with disabilities and various individual needs study and learn together with other children in the general education system. It creates conditions for children to become active participants in society, to fully integrate into the life of society. The active participation of parents in this process is very important. They not only provide a home environment for the child's development, but also, in cooperation with educational institutions, create a comfortable and supportive environment for the child.

The following recommendations will help you with this:

1. Take an active part in your child's life;
2. Support your child at home;
3. Help him/her adapt socially
4. Celebrate successes,
support him/her in failures;
5. Understand and
accept your child's capabilities;
6. Teach your child to be independent;
7. Develop yourself as well;
8. Adapt the home environment;
9. Exchange experiences with other parents;
10. Prepare your child for socialization.

Psychological recommendations for a responsible and effective approach

1. Regard the child's abilities with trust and love;
2. You too should avoid drawing wrong conclusions and
comparing the child with others;

3. Celebrate even the small achievements of your child
- this will increase his self-confidence;
4. If you feel tired or difficult, do not hesitate to consult a qualified psychologist.

Recommendations for eliminating obstacles: Introducing per capita financing in the education system; Training and improving the skills of teachers and leaders; Increasing teachers' salaries, paying additional salaries; Equipping institutions (ramps, special educational rehabilitation, medical and equipment elevators, specially equipped learning spaces); Raising public awareness of inclusive education; Working with parents.

Specific forms of practical assistance –

- Individualized Education Plan - Should be developed in collaboration with teachers and specialists.
- Motivating children - Building confidence through leading questions, encouragement, and praise.
- Teaching through play - Building academic and social skills through play.
- Reading together - A way to encourage reading and develop speech.
- Using digital tools - Special platforms, audio materials, apps, and programs.

In conclusion,

By creating a scientific base for inclusive education in Uzbekistan, developing methodological developments, innovative approaches and international experience exchanges, and ensuring stability, inclusive education will become a single principle of general education in the future, enriched on the basis of technological and pedagogical innovations, the human dignity of every child will be recognized and respected, and a stable, equal and comfortable environment for learning will be created.

In conclusion, it should be noted that the formation of inclusive competence in preschool and general secondary school educators and pedagogical staff is a complex, continuous and systematic process. In this regard, the following levels of attention should be paid to the training of modern personnel working in an inclusive educational environment:

1. Adherence to the principles of continuity and interdependence in the implementation of inclusive education;

2. The problem of inclusive education is a problem faced not only by future defectologists, but also by future primary and preschool teachers, and the content of inclusive education should be more widely included in the content of pedagogical disciplines in the curriculum of these areas;

3. Incorporating modern theories of inclusive education into educational practice, creating conditions for future primary and preschool teachers to master the basics of person-oriented approaches in teaching;

4. To involve senior students of primary education and preschool education of higher educational institutions as tutors (assistant pedagogical staff) in general education institutions where an inclusive education system has been introduced during the pedagogical practice period;

5. It is necessary to develop pedagogical, psychological, methodological literature, manuals, recommendations and programs that will help teachers and educators create a safe inclusive educational environment for children in need of special assistance.

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POSSIBILITIES FOR INTEGRATING THE TEACHING METHODOLOGY OF SEMICONDUCTOR PHYSICS AND NANOTECHNOLOGY

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Abstract. *This article highlights the importance of an integrative approach in teaching semiconductor physics and nanotechnology topics. It provides methodological recommendations for using PhET and NanoHUB virtual laboratories in the educational process.*

Keywords: *semiconductor physics, nanotechnology, integrative approach, virtual laboratory, PhET, NanoHUB, band structure, methodology, interdisciplinary connection.*

Introduction

In recent years, the decrees and resolutions of the President of the Republic of Uzbekistan aimed at developing science, supporting innovative ideas, and modernizing the education system have created the main legal foundation for reforms in this direction. In particular, the *"Strategy for the Development of Science, Technology, and Innovation for 2022–2030"* and the resolution *"On Improving the Activities of the Agency for Innovative Development"* have defined the task of integrating modern scientific research into the educational process.

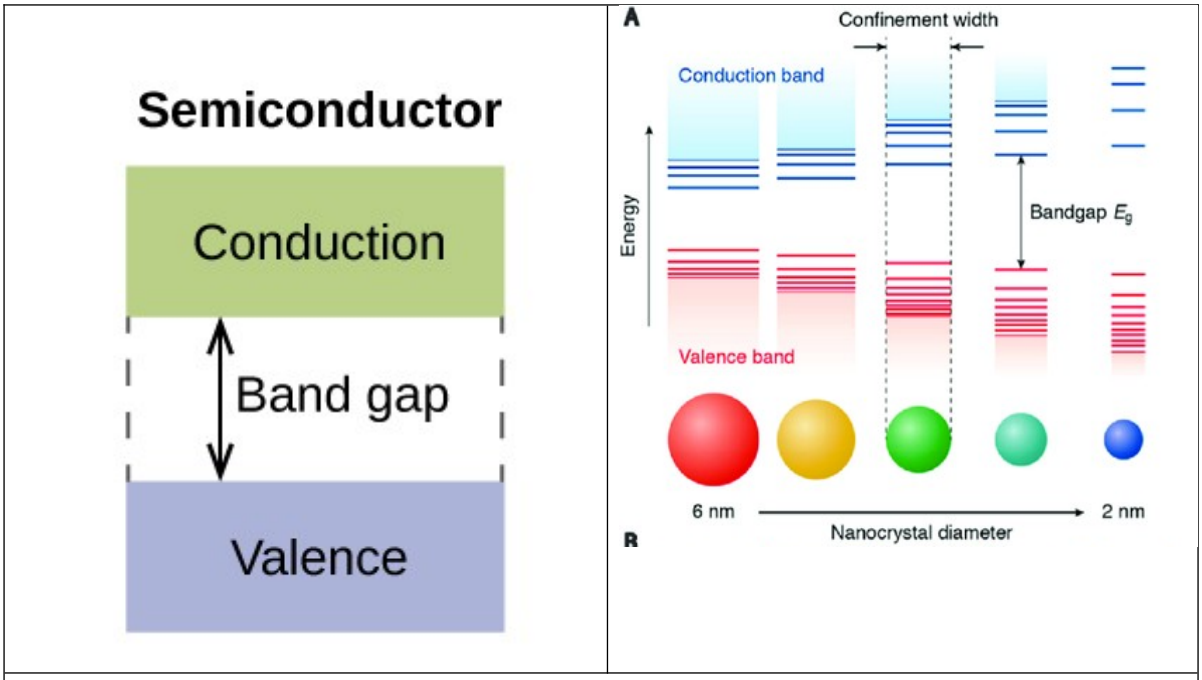
The physics of semiconductors forms the scientific basis of modern electronics and information technologies. Knowledge in this field is now closely interconnected with nanotechnology. ***Nanotechnology*** is a science that studies and manipulates the structure of matter at the atomic and molecular levels, playing a crucial role in the creation of new-generation electronic devices based on semiconductor materials. Therefore, integrating these two fields into the teaching of physics serves as an effective means of developing students' scientific thinking, modeling skills, and practical competencies.

Both semiconductor physics and nanotechnology are based on studying the structure of matter at the micro and nano levels, as well as the quantum-mechanical processes occurring within it. The foundation of both disciplines lies in analyzing the interatomic bonding energy, the states of valence electrons, and the system of energy levels. The electrical, optical, and thermal properties of semiconductors are determined by their crystal lattice and energy band structure. Similarly, in nanotechnology, structural changes at the atomic and molecular levels lead to the emergence of new material properties.

Nanotechnology has evolved in practice as a technology for creating and manipulating nanoscale forms of semiconductor materials. For example, quantum dots, nanorods, and nanotubes fabricated from semiconductors such as silicon (Si), gallium arsenide (GaAs), and cadmium selenide (CdSe) make it possible to control the motion of electrons. These processes occur not according to the laws of classical physics, but are governed by the principles of quantum mechanics. Therefore, semiconductor physics serves as the theoretical foundation of nanotechnology.

There are also significant similarities between the analysis of matter at the micro and nano levels. At the micro level, semiconductor research focuses on processes such as electron

transitions, recombination, and generation phenomena, whereas at the nano level, these phenomena are determined by boundary states. Furthermore, the reduction in particle size leads to the discretization of energy levels — which, in both fields, represents the manifestation of quantum effects.



As the particle size decreases, the degree of quantization of its energy levels becomes more pronounced.

In modern scientific and technological development, semiconductor physics and nanotechnology are emerging as complementary and closely interrelated fields. A deep understanding of the fundamental physical principles of semiconductors has led to the creation of highly efficient diodes, transistors, integrated circuits, microprocessors, and sensors in the electronics industry. At the same time, the demand to further miniaturize these devices, reduce energy consumption, and enhance performance has necessitated the introduction of nanotechnological approaches. Nanotechnology is expanding the potential of semiconductor materials to an entirely new level. Various nanostructures based on classical semiconductors such as silicon (Si), gallium arsenide (GaAs), and cadmium selenide (CdSe) have been developed, allowing for precise control of their physical properties. As a result, the efficiency of solar cells is being increased, highly sensitive optical sensors and radiation detectors are being created, and nanoparticles used in biomedical applications are being developed.

Semiconductor physics, as a science that studies the energy states of electrons and the laws governing their motion within matter, constitutes the theoretical foundation of nanotechnology. Conversely, nanotechnology reveals new possibilities for semiconductor physics by translating its achievements into practical applications. For instance, quantum transitions that were once studied only under laboratory conditions are now utilized in real electronic devices such as quantum diodes, lasers, and nanotransistors. Moreover, the advancement of semiconductor nanomaterial fabrication technologies is expanding the element base for energy-efficient electronics, digital optics, medical diagnostics, and artificial intelligence systems. For example, the development of nanochips based on graphene, MoS_2, and other two-dimensional semiconductor materials is propelling the field of microelectronics to a new stage of progress.

In the modern education system, the principle of interdisciplinary integration is becoming an integral part of the learning process. In particular, linking core natural sciences such as physics with technological fields contributes to the development of students' ability to apply theoretical knowledge in practical contexts. From this perspective, teaching topics related to semiconductor physics and nanotechnology through an integrated approach can be considered one of the most effective ways to foster scientific thinking. Semiconductor physics is based on fundamental concepts such as electron motion, energy bands, and conduction mechanisms, while nanotechnology studies the practical manifestations of these processes at the nanoscale. Therefore, teaching these two fields in an interrelated manner enables students to comprehend the continuity between physical phenomena occurring at the micro and nano levels.

Below, we examine an integrative analysis between the electrical conductivity of semiconductors and nanotube technology, which belong to both fields. In classical semiconductors (such as silicon and germanium), electrical conductivity depends on the orderliness of the crystal lattice and the concentration of charge carriers. However, when the material dimension reaches the nanoscale, the motion of electrons is governed not by the laws of classical mechanics but by the principles of quantum mechanics. This leads to the emergence of new types of conduction states. It is at this stage that the role of nanotechnology becomes evident.

Nanotechnology is a field that enables the modification of material properties at the atomic and molecular levels, and one of its most important directions involves carbon nanotubes (CNTs) and graphene-based materials. Due to their unique atomic structures, these materials exhibit exceptionally high electrical conductivity, mechanical strength, and thermal stability. Because of the sp^2-hybridized bonding of carbon atoms, electrons can move along the lattice with minimal scattering — that is, in a ballistic manner. This behavior, fundamentally different from that of classical semiconductors, allows the transmission of electrical energy with minimal loss.

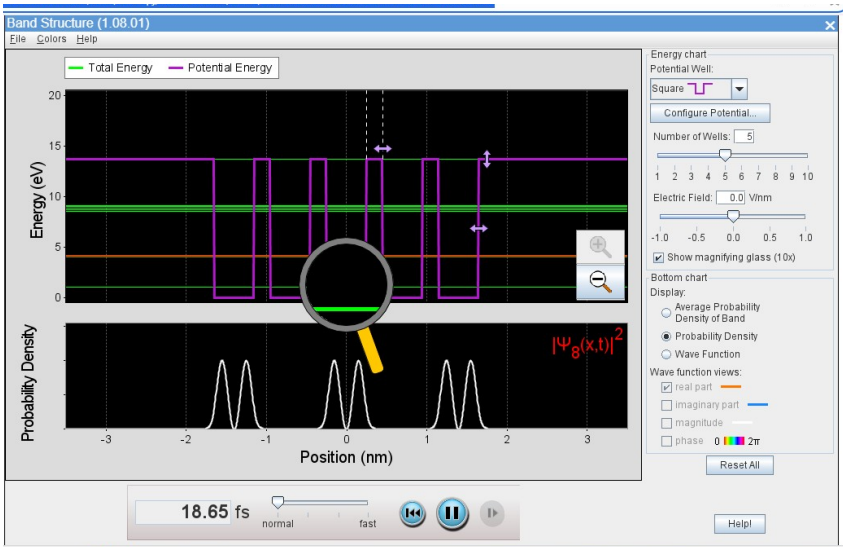
Integrating the classical theory of semiconductors with nanotube technology in the teaching process helps students develop the ability to analyze material transformations at the micro and nano levels, understand variations in energy states, and approach new technological solutions from a scientific perspective. A variety of methodological approaches can be employed to implement such integration in the classroom. The **comparative table method** is an effective instructional approach that helps students develop skills in analyzing physical processes, comparing the properties of different materials, and identifying common scientific principles. Through this approach, learners independently discover the interrelationships between **semiconductor physics** and **nanotechnology**.

Indicators	**Silicon (Si) Semiconductor**	**Graphene (C) Nanomaterial**
Structure	Crystal lattice with a tetrahedral structure	Single-atom-thick layer of carbon atoms arranged in a hexagonal lattice
Electrical Conductivity	Increases with temperature; can be controlled by impurities (doping)	Very high; electrons move ballistically
Band Gap (Eg)	~1.1 eV	0 eV (semimetallic property)
Thermal Resistance	Moderate (up to 600–800 °C)	Very high (up to 3000 °C)
Field of	Classical microelectronics,	Nanochips, sensors, high-frequency

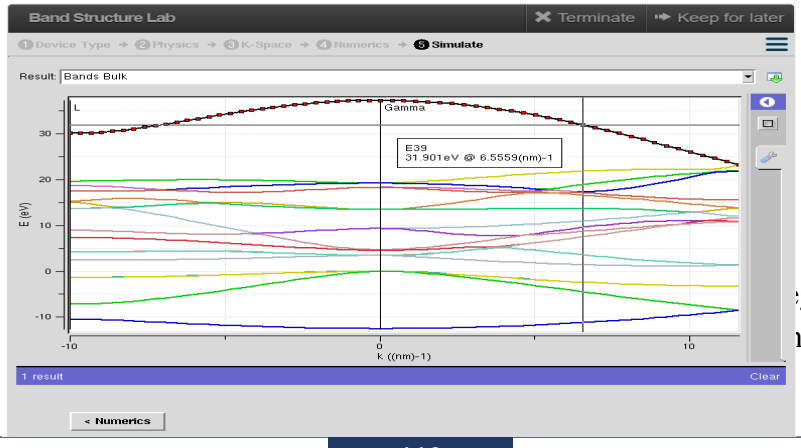
Application	transistors	transistors
Methodological Significance	Helps explain the basic physical laws of semiconductors	Provides an understanding of physical processes at the nanoscale

Virtual laboratories — in particular, platforms such as PhET Interactive Simulations and NanoHUB — allow students to model the effects of temperature, size, and external fields on electrical conductivity, enabling them to visually analyze real physical processes. Below, the general and specific features of these platforms are analyzed.

The "Band Structure" simulation on the PhET platform helps students understand the structure of electronic energy levels and the conductivity properties of materials. Through this simulation, learners can visualize the energy bands (valence, forbidden, and conduction bands), the filled and empty electronic states, and how these factors influence the physical properties of materials.



The "Band Structure Lab" simulation on the NanoHUB platform allows users to calculate and analyze the energy band structures of various materials, including nanostructures such as graphene nanoribbons. In this environment, users can modify parameters such as ribbon width, edge type (armchair or zigzag), and quantum dimensions to visually observe the energy–momentum relationship of electrons. Through the simulation, the band gap width as well as the shapes of the valence and conduction bands can be determined, which facilitates a deeper analysis of the conductive and semiconducting properties of nanomaterials. The platform is convenient for both educational and research purposes, providing an interactive means of studying semiconductor physics.



the PhET and egrative Potential of noHUB Platforms

Indicators	PhET: "Semiconductors" Simulation	NanoHUB: "Graphene Nanoribbon Bandstructure Lab"
Scientific direction	Simulation of electrical conductivity and PN junction phenomena in semiconductors	Modeling the energetic band structure of graphene nanoribbons and similar nanostructures
Theoretical basis	Classical semiconductor physics (PN junction, doping, current flow)	Quantum mechanics-based discretization of energy levels
Visual interface	Simple, interactive, and intuitive for learners	Scientific interface with graphical visualization of band structures
Practical outcome	Demonstrates effects of temperature, doping, and external electric fields on conductivity	Enables analysis of conductivity and energy band variations in nanostructures
Educational purpose	Helps students understand the operational principles of semiconductors	Expands research capabilities, promotes advanced scientific thinking
Level of coverage	Suitable for secondary education and academic lyceums	Designed for undergraduate and research-level studies
Integration potential	Forms basic conceptual understanding	Deepens theoretical knowledge and develops analytical thinking

Conclusion

It can be assumed that the use of an integrative approach in teaching topics related to semiconductor physics and nanotechnology makes the educational process more effective. Such an approach helps students to visualize theoretical concepts through practical models, understand interdisciplinary connections, and develop independent analytical thinking skills. The application of virtual laboratories such as PhET and NanoHUB in the learning process engages students in modeling real physical phenomena, which contributes to increasing their learning motivation.

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MODEL FOR DEVELOPING VISUAL-GRAPHIC COMPETENCIES OF ENGINEERING STUDENTS IN A HYBRID LEARNING ENVIRONMENT BASED ON DIDACTIC REQUIREMENTS

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Abstract. *This article presents a model for developing visual-graphic competencies of engineering students in a hybrid learning environment based on didactic requirements. The study is based on the principles of a competence-based approach, pedagogical modeling, and the integration of hybrid learning technologies. In modern engineering education, working with graphic modeling, technical drawings, diagrams, and visual communication tools is considered one of the essential professional competencies. During the study, the didactic possibilities of integrating hybrid learning technologies, visual teaching tools, and digital graphic software into the educational process were analyzed. As a result, a didactic model consisting of goal-oriented, content-based, technological, and assessment components was proposed. The findings show that developing visual-graphic competencies in a hybrid learning environment improves students' technical thinking, visual literacy, and independent learning skills. The proposed model can contribute to improving the effectiveness of engineering education.*

Keywords: *hybrid learning, engineering education, visual-graphic competence, didactic model, blended learning, graphic modeling.*

Introduction

In recent years, the rapid development of digital technologies and information-communication tools has led to the emergence of new pedagogical approaches in higher education. Particularly after the COVID-19 pandemic, the use of hybrid and blended learning models in the educational process has significantly expanded. These models combine traditional classroom instruction with online learning technologies, increasing the flexibility and effectiveness of the learning process. In engineering education, visual-graphic competencies are considered essential professional skills in preparing modern specialists. Working with technical drawings, diagrams, models, and visual simulations is an integral part of engineering practice and requires the development of students' graphical thinking and visual communication skills. The advancement of digital graphic tools and computer modeling technologies has further increased the relevance of this issue. Recent pedagogical studies indicate that the use of digital tools in hybrid learning environments enhances student engagement, promotes independent learning skills, and improves the overall effectiveness of the educational process.

At the same time, the didactic organization of visual teaching tools plays an important role in teaching engineering disciplines. However, existing research has not sufficiently developed a unified didactic model for developing visual-graphic competencies of engineering students in a hybrid learning environment. This highlights the need for further research in this area. The

objective of this study is to develop a model for improving engineering students' visual-graphic competencies in a hybrid learning environment based on didactic requirements. Therefore, this study proposes a didactic model for developing visual-graphic competencies of engineering students in a hybrid learning environment.

Methods

This study focuses on developing a didactic model for enhancing visual-graphic competencies of engineering students in a hybrid learning environment and is based on theoretical analysis and pedagogical modeling methodology. Scientific literature published between 2020 and 2025 on hybrid learning, visual literacy, and the use of digital technologies in engineering education was analyzed. In recent years, hybrid and blended learning have been widely studied as effective pedagogical approaches in higher education. Studies conducted between 2021 and 2025 show that hybrid learning models improve flexibility in the learning process, increase student engagement, and support the development of digital competencies (Boelens et al., 2021; Rasheed et al., 2022).

Research also indicates that the use of digital technologies and visual teaching tools in hybrid learning environments positively influences students' academic performance. For example, multimedia learning materials and visual modeling tools deepen understanding of engineering subjects and support the development of graphical thinking (Cabero-Almenara et al., 2022). The development of visual-graphic competencies in engineering education is considered an important component of modern professional training. Recent studies show that CAD systems, virtual laboratories, and simulation tools contribute to the development of students' technical thinking (Sánchez-García et al., 2023). Post-pandemic research on hybrid learning effectiveness confirms improvements in student motivation, independent learning skills, and collaborative activities (Singh et al., 2021; Martin et al., 2022). At the same time, digital infrastructure and pedagogical design are identified as key factors for successful implementation of hybrid learning (Huang et al., 2023).

Modern approaches aimed at developing visual literacy emphasize the importance of analyzing graphical information, modeling, and forming visual communication skills as an integral part of engineering education (López-Belmonte et al., 2024). The above studies confirm the significance of hybrid learning and visual teaching technologies in engineering education. However, existing research has not sufficiently developed a unified didactic model for fostering visual-graphic competencies in a hybrid learning environment. The present study seeks to fill this scientific gap. In selecting the literature, articles indexed in Scopus and other scientific databases were reviewed. The search process employed keywords such as "hybrid learning," "blended learning," "visual literacy," "engineering education," and "digital competence."

The selected scientific sources made it possible to analyze the effectiveness of teaching in hybrid learning environments, as well as the impact of digital learning tools and visual modeling technologies on the educational process (Cabero-Almenara et al., 2022; Huang et al., 2023; López-Belmonte et al., 2024). A competence-based approach was applied as the main methodological principle of the study. According to this approach, visual-graphic competencies in engineering education are manifested through the ability to understand graphical information, perform modeling, work with technical drawings, and carry out visual communication.

Using the pedagogical modeling method, a didactic model for developing visual-graphic competencies in a hybrid learning environment was designed. The model consists of the following components:

- goal component,
- content component,
- technological component,
- assessment component.

In addition, the positive impact of hybrid learning technologies on students' engagement in the learning process and the development of independent learning skills was summarized based on scientific literature (Martin et al., 2022; Rasheed et al., 2022). This methodological approach made it possible to systematically describe the process of developing visual-graphic competencies in engineering education and to theoretically substantiate the proposed didactic model.

Results

As a result of the study, a didactic model aimed at developing visual-graphic competencies of engineering students in a hybrid learning environment was developed. The model is based on the integration of a competence-based approach, visual teaching technologies, and hybrid learning methods. The proposed model reflects the interconnection of the main didactic components of the educational process and ensures the systematic development of visual-graphic competencies.

Model for developing visual-graphic competencies The model consists of four components:

1. Goal component:
- development of visual literacy;
- formation of graphical thinking;
- understanding of technical drawings;
- development of visual communication skills.
2. Content component:
- graphic modeling;
- fundamentals of CAD;
- working with diagrams and schemes;
- infographic design.
3. Technological component:
- LMS platforms;
- virtual laboratories;
- AutoCAD / SolidWorks;
- flipped classroom;
- interactive visual assignments.
4. Assessment component:
- project-based tasks;
- graphic portfolios;
- rubric-based assessment;
- practical assignments.

The following scheme illustrates the process of developing visual-graphic competencies in a hybrid learning environment. Model implementation stages Based on the analysis, the following stages of model implementation were identified:

- Diagnostic stage — identifying students' visual-graphic competencies.
- Design stage — developing the hybrid course design.
- Implementation stage — visual assignments and graphic projects.
- Assessment stage — monitoring the development of competencies.

The analysis showed that in a hybrid learning environment:

- the use of visual materials facilitates understanding of educational content;
- graphic modeling tools develop technical thinking;
- interactive assignments increase students' independence.

As a result, the proposed model represents a systematic mechanism for developing visual-graphic competencies in engineering education.

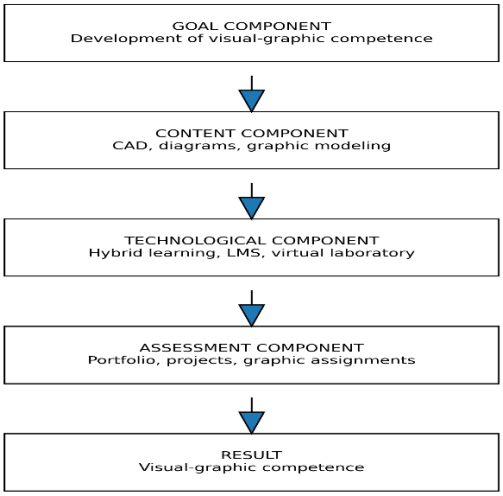


Figure 1. Model diagram

Discussion

The results of the study indicate that developing visual-graphic competencies in a hybrid learning environment contributes to improving the effectiveness of engineering education. The integration of visual modeling tools, graphic software, and interactive assignments into the learning process positively influences students' technical thinking and visual literacy. Recent studies confirm that hybrid and blended learning environments support independent learning and increase student engagement in the educational process (Martin et al., 2022; Rasheed et al., 2022). These findings are consistent with the pedagogical foundations of the model proposed in this study.

In engineering education, the use of graphic modeling and visual tools facilitates the understanding of complex technical concepts. This contributes to the development of students' problem-solving and modeling skills. In addition, virtual laboratories and CAD systems enrich the learning process with practical activities. Another important aspect of the hybrid learning environment is the flexibility of the learning process and the opportunity for individualized learning. Organizing visual-graphic assignments on digital platforms promotes collaboration among students and increases interactivity in the learning process. At the same time, technological infrastructure, teachers' digital competence, and instructional design are essential for the effective implementation of hybrid learning (Huang et al., 2023). These factors should be considered when implementing the model in practice.

Overall, the proposed didactic model represents a systematic mechanism for developing visual-graphic competencies of engineering students in a hybrid learning environment. The model integrates pedagogical modeling, visual teaching tools, and digital technologies to improve the quality of engineering education.

Conclusion

In conclusion, this study analyzed the theoretical foundations of developing visual-graphic competencies of engineering students in a hybrid learning environment based on didactic requirements and developed a didactic model using the pedagogical modeling method. The proposed model consists of goal-oriented, content-based, technological, and assessment components and is aimed at integrating hybrid learning technologies with visual teaching tools.

The findings show that the use of graphic modeling tools, digital learning platforms, and interactive assignments in a hybrid learning environment contributes to the development of students' visual literacy, technical thinking, and independent learning skills. The importance of visual-graphic competencies as a key component of engineering education is also substantiated. The proposed didactic model can contribute to improving the organization of engineering education, optimizing the use of hybrid learning technologies, and enhancing students' professional competencies.

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MAIN STAGES, TRENDS AND PROBLEMS OF THE EVOLUTION OF QUALITY ASSURANCE IN HIGHER EDUCATION

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Abstract. *The article analyzes the formation of the quality assurance system of higher education, it's historical evolution, the main stages, world trends and modern problems. On the basis of international experience and national reforms, conceptual approaches to ensuring the quality of higher education, mechanisms of internal and external quality assurance, factors for the development of incentive and control systems are highlighted.*
Keywords: *quality assurance, quality indicators, quality culture, digital monitoring systems, accreditation agencies.*

Introduction. The Resolution of the President of the Republic of Uzbekistan Sh. Mirziyoyev dated September 8, 2025, No. PQ-275, "On the Organization of Activities of the National Agency for Quality Assurance in Education under the Administration of the President of the Republic of Uzbekistan", sets forth objectives such as forming a quality culture in educational institutions, improving internal quality control criteria and procedures, and developing criteria and methods for assessing educational quality based on international standards and advanced foreign experience. These tasks necessitate the identification of key indicators that ensure quality assurance.

Currently, higher education is viewed not only as a system that provides knowledge and skills, but also as one of the main drivers of national competitiveness. In the context of globalization, increasing demands for transparency, openness, efficiency, and accountability of higher education institutions require the continuous improvement of Quality Assurance (QA) systems. Therefore, a systematic study of the evolution of quality assurance in higher education, as well as a scientific analysis of its essence and challenges, is considered highly relevant.

However, many problems have arisen during the implementation and implementation of quality assurance systems. Especially in developing countries, there is a lack of resources, low internal capacity, educational material is not adapted to life situations, professional activities, problems with linking training to practice limit the effectiveness of quality assurance mechanisms. Description of the historical development stages and main trends of quality assurance through a comprehensive analysis of the main stages of the evolution of quality assurance in higher education, modern trends and current problems, the main goal of this research is to systematize problems in quality assurance practice and offer scientific and practical solutions adapted to the situation for their elimination. During the research, foreign scholars such as Philip B. Crosby, Michael Fullan, John Hattie, Donald Schön, Linda Darling-Hammond, and Charlotte Danielson studied quality management, quality assurance, change management in education, assessment of educational quality, and improvement of teaching effectiveness, statistical analysis and continuous improvement to improve the quality of education, reflexive practice and professional development

of pedagogues, theory and practical directions of evaluation and development of professional competence of pedagogues. In addition, scientific sources in this area and articles in scientific databases such as SciSpace, Google Scholar, and ArXiv were studied. During the study, as a result of comparing the quality assurance systems of Europe, Asia, Africa, and the CIS countries, the development and transformation of quality assurance over time was observed. Quality assurance is a continuous process aimed at ensuring that the educational process, learning outcomes, and management practices of higher education institutions comply with established standards and criteria. Modern definitions of quality assurance emphasize reliance on clear norms and standards, continuous monitoring and evaluation, consideration of civil society and labor market demands, institutional autonomy, and accountability. Quality assurance is not regarded as a periodic inspection conducted between accreditations, but rather as a process oriented toward systematic development.

Main Stages of the Evolution of Quality Assurance in Higher Education

Stage 1. Bureaucratic and Control-Based Models (1950–1980):

• centralized state control;

• quality assessment in higher education institutions was mainly limited to resources (staff, infrastructure);

• quality was measured through “input resources”.

Stage 2. Accreditation and Standardization Stage (1980–2000):

• independent accreditation agencies were established in the USA, Europe, and Asia;

• external evaluation of educational programs and higher education institutions was institutionalized;

• the Lisbon Convention (1997) and the Bologna Process (1999) laid the foundation for the internationalization of quality assurance.

Stage 3. Internal Quality Management and Outcome-Based Orientation (2000–2015):

• internal quality assurance systems were introduced in higher education institutions;

• concepts such as “learning outcomes” and “competence-based education” became central to academic discourse;

• the most important criterion became graduates’ qualifications and their performance in the labor market.

Stage 4. Internationalization and Competition (from 2015 to the present):

• global rankings such as QS, THE, and ARWU shaped new quality assurance indicators;

• digital and online education technologies introduced new quality measurement criteria;

• micro-credentials, online accreditation, and distance-based quality control mechanisms have developed.

Global trends in higher education are characterized by criteria such as outcome-based education (graduates’ competencies, applicable skills, and productivity in professional practice); the balance between autonomy and accountability (institutional freedom of higher education institutions combined with accountability requirements based on performance); digitalization of quality assurance (electronic accreditation platforms, learning analytics, AI-assisted monitoring); international compatibility and mutual recognition (integration with agencies such as ENQA, EQAR, ASIIN, and ABET); and continuous assessment, which replaces multi-year accreditation cycles with monitoring based on annual performance indicators.

International experience and scholarly analyses indicate that a number of unresolved challenges persist within quality assurance systems. These include differing interpretations of

quality among students, employers, government bodies, and academic staff, resulting in inconsistent application of the concept of quality; excessive government control in some countries, which reduces the effectiveness of internal quality assurance; formalistic reporting practices where results are not reflected in actual outcomes; misalignment of educational content and curricula with the needs of the real economy; insufficient scientific and pedagogical capacity and competency frameworks; and the inefficient use of digital platforms. All these issues negatively affect the effectiveness of quality assurance.

In our country, the implementation of reforms in the education sector has served as a foundation for fundamental changes in the system of quality assurance in education:

1. Establishment of the National Agency for Quality Assurance in Education and granting it independent authority;

2. Introduction of international accreditation requirements in higher education institutions and the implementation of accreditation by international agencies;

3. Adoption of outcome-oriented educational standards;

4. Establishment of systematic monitoring in higher education institutions based on feedback from students and employers;

5. Introduction of automated assessment systems that minimize the human factor.

These positive measures contribute to aligning the national higher education system with international standards and ensuring educational quality. The analysis of international experience in education quality management made it possible to identify strategic approaches used in leading education systems of the world to ensure sustainable development and competitiveness. Based on international practices, general patterns and innovative trends, the following conclusions were drawn:

1.The combination of national standards and international criteria is emerging as a key factor in quality management. The experience of countries such as Germany, Finland, and Sweden shows that integrating unified national standards in ensuring the quality of education with international criteria such as OECD (Organization for Economic Cooperation and Development), UNESCO (United Nations Educational, Scientific and Cultural Organization), and EQAR (The European Quality Assurance Register for Higher Education) helps to increase the efficiency of the system.

2. Automation of monitoring and evaluation in the educational process based on artificial intelligence. In universities in the USA, Canada and England, mechanisms such as Learning Analytics, AI-based Assessment, data-driven decision-making are widely used in quality assessment. This provides opportunities such as: early identification of problems in the educational process, creation of individual trajectories, optimization of resource allocation.

3. As the most important indicator of the quality of education, ensuring the level of professional skills of the teacher through the development of his competence is also of urgent importance. In the system of teacher training in Finland, France and Russia, approaches such as support for authorial methodologies, academic freedom, continuous professional development, socio material incentives for the teacher serve as the main criteria for organizing quality education.

4. Public participation and accountability mechanism in ensuring the quality of education. In international practices, students, employers, parents and public organizations are involved in the quality analysis and decision-making process through the principles of transparency accountability. This increases the flexibility of the education system to the needs and demands of society.

5. Digital transformation and effective use of open education platforms in an innovative educational environment. International trends have shown that MOOCs, EdTech, blended learning, VR/AR, STEAM technologies play an important role in improving the quality of education. Individualization of education through digital technologies, effective use of educational resources, distance education are moving to new qualitative stages.

6. The continuous improvement cycle of education quality (PDCA (Plan-Do-Check-Act: Planning-Execution-Inspection-Act)) has been adopted as an international standard. In China, Germany and the USA, the Plan-Do-Check-Act cycle is used as the main model of quality management. In this system, planning, implementation, monitoring, improvement are organized as an interrelated and constantly rotating process.

Considering that it is not effective to completely transfer one model in education quality management to another country, each country should plan based on the characteristics of its national education system. Countries that effectively ensure the quality of education have formed integrated models in their education systems, taking into account factors such as national culture, economic opportunities, labor market requirements, and demographic characteristics. Analysis of international experience has shown that innovative approaches, digital transformation, independent assessment systems, development of teacher qualifications, and public participation are important in managing education quality. These factors ensure the system's openness, activity, and responsiveness to the real needs of society. The most effective directions for our education system are to create a national quality model consistent with international standards, strengthen the development of professional competence of teachers, automate monitoring based on AI and learning analytics, expand public participation, and create an innovative, digital educational environment, which will serve as a scientific and practical basis for improving the national strategy for managing the quality of education.

Conclusion. Based on the above, it can be concluded that the quality assurance system in higher education has evolved over the years from a resource-based control model to a result-oriented, competition-based, and globally integrated framework. Today, quality assurance has become a core component of higher education institutions' activities, a strategic development instrument, and a key factor determining national economic competitiveness. In our republic, consistent steps are being taken to establish a quality assurance system aligned with international standards. However, the development of human capital, strengthening digital monitoring, and increasing the autonomy of higher education institutions remain pressing priorities. To further improve quality assurance, it is essential to harmonize national and international standards, develop digital monitoring systems, enhance staff capacity, and systematically promote university–employer integration.

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BENEFITS OF INTRODUCING ARTIFICIAL INTELLIGENCE TECHNOLOGIES INTO HIGHER EDUCATION

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Abstract. *This article scientifically analyzes the main advantages of introducing artificial intelligence technologies into the higher education system. The research highlights the role of artificial intelligence technologies in personalizing the educational process, improving assessment mechanisms, and increasing the efficiency of academic management. The results of the study indicate the need for a systematic and scientifically based approach to introducing artificial intelligence technologies into higher education. The results of the article serve to develop scientific and practical recommendations for the effective introduction of modern digital technologies in higher education institutions.*

Keywords: *artificial intelligence, higher education, digital transformation, adaptive learning systems, automated assessment, educational quality, information technology.*

INTRODUCTION. In recent years, the acceleration of digital transformation processes has had a significant impact on all parts of the education system, in particular, higher education institutions. The development of information technologies allows organizing educational processes in a more efficient, flexible and result-oriented manner. In this process, artificial intelligence (AI) technologies are gaining special importance, appearing as an important tool for improving the quality of education, optimizing teaching processes, and taking into account the individual needs of learners [1].

Traditional higher education models are often based on standardized curricula and uniform assessment mechanisms. This approach does not allow for full consideration of differences in students' knowledge levels, interests, and learning rates. As a result, the effectiveness of the educational process decreases, student motivation decreases, and teachers' workload increases. Artificial intelligence technologies offer adaptive learning systems, intelligent recommendation mechanisms, and automated assessment tools to overcome these problems [2].

The scientific literature notes that the use of artificial intelligence technologies in higher education allows for personalization of the learning process, real-time analysis of student activity, and prediction of academic results [3]. For example, machine learning algorithms serve to predict academic success of students by analyzing data on their academic activity. Also, systems created based on natural language processing technologies allow for automatic checking of written work and providing quality feedback.

However, the process of introducing artificial intelligence technologies into higher education is complex and multifaceted, and is not limited to technical aspects. This process is inextricably linked to issues of pedagogical methodology, organizational management, ethical standards, and data security. Scientific sources emphasize that the misuse of AI systems can lead to

a violation of algorithmic impartiality, a threat to the integrity of personal data, and problems with academic integrity [4].

An analysis of existing research shows that most scientific works are devoted to specific areas of application of artificial intelligence technologies in higher education, and their impact on the quality of education is often covered in a fragmentary manner [5]. In this regard, studying the main advantages of introducing artificial intelligence technologies into higher education based on a comprehensive and systematic approach is a scientifically relevant issue.

METHODOLOGY. This article uses a comprehensive scientific approach to identify and assess the benefits of introducing artificial intelligence technologies into the higher education system. The research is based on the methods of systematic analysis, comparison, and logical generalization. These methods allow for an in-depth study of existing scientific sources and an objective assessment of the impact of artificial intelligence technologies on the educational process.

RESULTS. The results of a global survey conducted by UNESCO in 2025 show that the implementation of artificial intelligence technologies in higher education institutions is accelerating. The survey was conducted among higher education institutions affiliated with the UNESCO Chair and UNITWIN networks and covered a total of 400 respondents from 90 countries. According to the results, almost two-thirds of respondents indicated that formal guidelines on the use of artificial intelligence in higher education institutions already exist or are in the process of developing them [6].

The survey results show a high level of use of artificial intelligence technologies. In particular, more than eight out of nine respondents (approximately 90%) reported using artificial intelligence tools in their professional activities, mainly in the process of scientific research and academic writing. Also, almost half of the respondents reported using artificial intelligence technologies in the teaching process, including in lesson planning, assessment support, and plagiarism detection. However, the results also show that despite the widespread use of AI technologies, the level of trust in them is not uniform.

More than half of the respondents indicated that they lacked sufficient knowledge or were hesitant about the effective use of AI in pedagogical and scientific processes, its technological characteristics and its impact on human rights, democracy and social justice. Among respondents who used AI little or not at all, ethical and environmental concerns, lack of technological knowledge, limited access to resources and the specific limitations of some scientific fields were cited as the main barriers [6].

Nearly a quarter of respondents said they have encountered ethical issues related to artificial intelligence at their higher education institutions, including overreliance on AI tools by students, authorship issues, and algorithmic bias in scientific research. A UNESCO survey also found that institutional policies and investments in AI are growing in higher education institutions. 19% of respondents said their institutions had a formal policy on AI, and another 42% said they were developing such guidelines. There were significant regional differences, with Europe and North America reporting nearly 70% of this, while Latin America and the Caribbean had around 45% [6].

These statistical results indicate that the implementation of artificial intelligence technologies in higher education institutions is actively ongoing globally, but there is a need for clear political and institutional mechanisms to effectively and responsibly manage this process. These results scientifically substantiate the benefits of introducing artificial intelligence

technologies into higher education, as well as the need for its regulation and implementation based on a humanistic approach. Statistical results provided by UNESCO show that the introduction of artificial intelligence technologies into the higher education system is yielding significant positive results. First of all, adaptive educational systems based on artificial intelligence serve to increase the level of student learning by personalizing the educational process. This leads to an increase in students' academic activity, increased motivation for the educational process, and the sustainability of the quality of education.

Also, the introduction of artificial intelligence technologies into assessment and monitoring processes will reduce the workload of teachers and increase objectivity and transparency in the educational process. The creation of the possibility of early identification of students at risk based on the analysis of academic data will help reduce dropout rates in higher education institutions.

These cases indicate that artificial intelligence technologies are emerging as an important analytical tool in higher education management. In terms of future prospects, the role of artificial intelligence technologies in the higher education system is expected to expand further. In particular, AI-based educational analytics, intelligent assistant systems, and generative technologies can reshape teaching methodologies. At the same time, the integration of AI literacy into higher education programs is likely to become an integral part of the educational process.

DISCUSSION. The results of this study show that the introduction of artificial intelligence technologies into the higher education system serves to raise the educational process to a qualitatively new level. The results obtained are generally consistent with the conclusions presented in the existing scientific literature and once again confirm the positive role of artificial intelligence technologies in personalizing education, improving assessment processes, and optimizing academic management.

One of the important aspects of the results is that adaptive learning systems based on artificial intelligence are more adaptable to the individual needs of students than traditional teaching methods. This, as noted in previous studies, leads to increased student motivation and improved knowledge acquisition. At the same time, the results of this study show that artificial intelligence technologies are an effective tool not only in the educational process, but also at the level of educational management.

The results of the discussion show that the effectiveness of artificial intelligence technologies in higher education depends on a systematic and phased approach to their implementation. Technological solutions that do not meet pedagogical goals or do not have a sufficient methodological basis may not produce the expected results.

Therefore, when introducing artificial intelligence technologies in higher education institutions, it is important to improve the digital competencies of teachers and redesign the educational process. In general, the results discussed show that the process of introducing artificial intelligence technologies into the higher education system is complex, but promising. Implementing this process on the basis of a scientifically based and responsible approach will serve to improve the quality of education and create a modern educational environment.

CONCLUSION. This study aims to scientifically analyze the benefits of introducing artificial intelligence technologies into the higher education system, and the results obtained confirm the strategic importance of these technologies in improving the quality of education. The study identified the role of artificial intelligence technologies in personalizing the educational process, improving assessment mechanisms, and increasing the efficiency of academic management. The results show that learning environments based on artificial intelligence can

increase student learning, increase their engagement in the learning process, and address individual needs. In particular, the use of adaptive learning systems and intelligent analytics tools has proven to be an effective mechanism for overcoming the limitations of traditional approaches in higher education.

The results of the study also showed that the introduction of artificial intelligence technologies into assessment processes increases the objectivity and transparency of assessment, while reducing the workload of teachers.

This creates additional opportunities for pedagogical and scientific activities in higher education institutions, and serves to increase the overall efficiency of the educational process. At the same time, the study showed the need for a systematic and scientifically based approach to the introduction of artificial intelligence technologies into the higher education system. The effective use of technological capabilities must be combined with pedagogical goals, ethical standards and data security requirements. Otherwise, the expected positive impact of artificial intelligence technologies may not be fully manifested.

In conclusion, the introduction of artificial intelligence technologies into the higher education system is one of the important factors ensuring the sustainable development of modern education. In future research, it is advisable to study the long-term impact of artificial intelligence technologies based on empirical data, as well as pay special attention to the issues of their adaptation to different scientific disciplines.

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THE CURRENT STATE AND EXISTING CHALLENGES IN THE SOCIAL ADAPTATION OF BOARDING SCHOOL GRADUATES

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Abstract. *This article examines the current state of the social adaptation process of graduates of boarding schools. The study identifies key challenges related to determining the professional orientation of students with disabilities, preparing them for employment, and integrating them into social life. Particular attention is given to the adaptation of graduates to independent living, the psychological factors influencing career choice, and the significance of typhlopedagogical approaches within the educational process. The analysis is based on a scientific and pedagogical framework and highlights the importance of targeted support measures in facilitating successful social integration.*

Keywords: *social adaptation; boarding schools; graduates; professional orientation; disability; inclusive education; typhlopedagogy; vocational preparation; social integration; psychological adaptation.*

Introduction

In the context of contemporary social development, societal progress is directly linked to the human factor, particularly to the level of social activity, professional preparedness, and life adaptation of the younger generation. For graduates of boarding schools, successful integration into social life represents a crucial stage that determines their future independent functioning and ability to find their place in society. Therefore, the scientific study and effective organization of the social adaptation process has become an issue of significant relevance.

For boarding school graduates - especially young people with physical or sensory disabilities - adaptation to independent life requires not only pedagogical support but also comprehensive social and psychological approaches. Establishing an educational and upbringing process adapted to their individual needs, capabilities, and interests serves as one of the key indicators of the level of inclusive development within society. In this regard, ensuring equal opportunities for social participation and personal development remains a priority task of modern education systems.

Under current socio-economic conditions, preparing graduating youth for life involves not only the acquisition of theoretical knowledge but also the development of practical skills, vocational orientation, and competencies necessary for active participation in social and professional activities. From this perspective, analyzing the effectiveness of vocational guidance, labor training, and social adaptation systems in boarding schools constitutes an important scientific and practical challenge. The relevance of this study lies in identifying the factors that hinder graduates' active participation in social life, assessing existing conditions, and determining ways to improve the process of social adaptation. Ultimately, this research substantiates pedagogical

approaches aimed at fostering the development of independent, socially active, and hardworking individuals among students educated within the boarding school system.

Literature Review and Methods

From an individual perspective, a rational and objectively grounded choice of profession becomes the foundation of personal self-determination, defining a person's socio-economic status, social environment, and lifestyle. From a societal standpoint, a well-reasoned career choice serves as the basis for early involvement in social and professional activities, as well as for achieving high professional performance, creative activity, and professional competence [1].

One of the effective methods for preparing a competitive workforce is the active involvement of students with disabilities and special educational needs in professional skills competitions and Olympiads at various levels. The primary objectives of such events include enhancing professional skills and facilitating the employment of students with disabilities. Participation in these competitions contributes to the development of creative activity experience, increases motivation for work, and creates favorable conditions for self-awareness, professional and social adaptation, and the improvement of professional competence [2].

In Uzbekistan, the World Bank has presented research findings indicating that individuals registered with various types of disabilities face significant economic and social challenges. According to official statistics, persons with disabilities constitute approximately 2.1% of the total population. However, considering that around 15% of the global population is estimated to have some form of disability, this figure is expected to be considerably higher [3].

As of the end of 2019, Uzbekistan recorded 693.9 thousand persons with disabilities (295.5 thousand women and 398.4 thousand men), including 111.3 thousand individuals under the age of 16 (48.8 thousand girls and 62.5 thousand boys), who received pensions and social benefits. These relatively low official figures may be explained by the outdated and limited system currently used in Uzbekistan for defining, assessing, and identifying disability. Research findings suggest that approximately 13.5% of the population aged three years and older may have some form of disability, while about 3.5% may experience severe disability [4].

Research Methods

The study employs a qualitative and analytical research approach, including the analysis of scientific literature, official statistical data, and international research reports. Comparative and descriptive methods are used to assess existing practices in vocational orientation, labor training, and social adaptation of boarding school graduates with disabilities. The findings are systematized to identify key challenges and to substantiate pedagogical recommendations aimed at improving social adaptation processes.

Results

Ensuring that individuals with physical disabilities are able to find their place in life is considered one of the most important social tasks. In this regard, vocational training for young people with disabilities has become an increasingly urgent issue. Prior to providing vocational education for graduates with visual impairments, it is essential to thoroughly assess their interests, abilities, and aptitude for mastering specific professions.

In boarding schools, the subject of technology is regarded as a practical discipline aimed at developing vocational skills among students. Through technology education, learners acquire knowledge of various professions under the guidance of teachers. However, not all vocational fields are equally suitable for every student, as it is crucial to take into account their physical and

cognitive capabilities. Therefore, educators should consider the following key factors in the instructional process:

First, adapting the content of technology-related subjects to meet the needs of students with visual impairments;

Second, assigning tasks and activities that can be effectively applied in practical situations;

Third, emphasizing group-based learning methods in teaching technology subjects;

Fourth, linking each lesson to hands-on practice and adjusting activities to correspond with students' sensory perception and cognitive imagination;

Fifth, strictly adhering to safety regulations during the educational process;

Sixth, making extensive use of typhlotechnical tools and assistive devices designed for students with visual impairments.

If the social adaptation of graduating youth is properly organized, it becomes possible to address many of the pressing challenges associated with their integration into independent life. As noted in the literature, "the problem of ensuring the social adaptation of children with disabilities during the school education period is not only pedagogical in nature, but also encompasses methodological, psychological, and social dimensions" [5].

Psychologist L. M. Mitina identifies several characteristics of the current social environment that modern secondary school students should consider when choosing a profession. These include the dynamic nature of the labor market, where approximately 500 new professions emerge each year, while many existing occupations remain relevant for only 5 -15 years before disappearing or undergoing significant transformation. Another important trend is the shift from monoprofessionalism to polyprofessionalism, which implies that individuals should strive to master not a single profession, but several related professional fields [6].

Professional education and employment constitute the foundation for the socialization of persons with disabilities. To ensure independent and productive participation in society, vocational education must be integrated into the targeted socialization process as one of its key institutional components. Addressing the challenges of vocational training requires the development and implementation of adapted educational programs tailored to the needs of individuals with disabilities. Such programs play a vital role in developing professional skills, enhancing work motivation, fostering self-awareness, and assessing readiness for professional activity [7].

Discussion

Since the process of delivering core knowledge in educational institutions is predominantly theoretical in nature, significant efforts are required to enhance vocational guidance activities. In this regard, it is essential to clearly define, systematically develop, and effectively implement vocational orientation tasks within the educational process [8].

Under modern socio-economic conditions, one of the most effective mechanisms for improving the social status and security of persons with disabilities is the provision of comprehensive vocational education. This approach is particularly relevant for individuals with visual impairments. An analysis of international experience demonstrates that the most effective and cost-efficient forms of professional self-realization for persons with severe visual impairments are concentrated in highly skilled labor sectors, which, in turn, require a higher level of education [9].

These findings emphasize the necessity of strengthening vocational education frameworks within boarding schools and ensuring continuity between general education, vocational training, and employment opportunities. The integration of theoretical knowledge with practical skill

development plays a decisive role in facilitating successful social and professional adaptation for graduates with disabilities.

Conclusion

The social adaptation of graduating youth studying in boarding schools represents a complex yet essential process that requires systematic and purposeful intervention. The results of the study indicate that successful organization of this process largely depends on improving vocational guidance systems within educational institutions, taking into account students' individual interests, psychological readiness, and physical capabilities.

Enhancing career orientation and providing adapted vocational training opportunities contribute significantly to enabling these young people to find their rightful place in society. Therefore, strengthening pedagogical, psychological, and social support mechanisms within the boarding school education system can be considered a key factor in fostering the development of independent, socially active, and professionally competent individuals.

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INTERACTIVE LESSON MODEL BASED ON HOLOGRAM TECHNOLOGIES AND METHODOLOGY FOR DEVELOPING SPEECH COMPETENCIES

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Abstract. *This article scientifically and methodologically substantiates an interactive lesson model based on hologram (holographic visualization) technologies in teaching the native language in primary grades (1–4), as well as a methodology for developing speech competencies (oral and written speech) through this model. The key components of the model are explained as the learner's active participation, visual-experiential (multimodal) perception, and mechanisms of reflective analysis. In addition, the possibilities of holographic content in terms of visualization, interactivity, and integration are demonstrated in teaching phonetics-graphics, word structure, sentence structure, and text meaning. The methodological basis relies on the constructivist paradigm, the concept of the zone of proximal development, dual coding, and multimedia learning theories.*

Keywords: *hologram technology, holographic visualization, interactive lesson model, multimodal perception, reflective analysis, speech competence, native language methodology, constructivism, dual coding, multimedia learning.*

Introduction

Interactive lesson model based on the use of hologram technologies. An interactive lesson model based on hologram technology is a pedagogical structure that directs native language lessons toward active student participation, visual-experiential perception, and reflective analysis. It enriches modern digital textbooks by supplementing information obtained from static text and image collections with live, three-dimensional staged content, transforming theoretical knowledge into practical activity. In educational theory, one of the central components of effectively organizing the learning process is the learner's active participation. Unlike a passive recipient of knowledge, an active learner directly engages with educational content by searching for knowledge, analyzing, communicating, and solving problems. Interactive pedagogical methods involve students in dialogue, question-answer sessions, collaboration, and solving problem tasks during the lesson, which develops independent thinking, critical analysis, and collaborative communication skills.

Visual experiential perception is the process by which a learner perceives knowledge through seeing, hearing, and practical experience; it transforms complex content from abstract to concrete and strengthens perceptual activity. According to diaspora pedagogical research, visual tools such as visualization, 3D models, animation, and holograms enable learners to perceive content through multiple channels (multimodal) and stimulate deep learning. In primary education, this approach serves to perceive initial phonetic, lexical, and syntactic knowledge through visual experiential concepts. Reflective analysis is associated with the learner's awareness of their own activity, analysis of their learning process, and improvement of mastery through evaluating results. A reflective learning environment allows learners to critically shape their ideas, work on their

mistakes, and improve learning strategies. Scientific studies consider reflective analysis as an important component that serves to develop students' metacognitive skills in language and general education processes.

In the educational process, active participation, visual experiential perception, and reflective analysis together activate the process of deep learning. Interactive teaching methods create conditions for students to interact with content, exchange ideas, analyze complex tasks, and strengthen speech expression skills, which demonstrates higher educational effectiveness compared to traditional approaches. Therefore, in a learning environment enriched with hologram technologies, these three components — active learner participation, visual experiential perception, and reflective analysis — together form the scientific basis of interactive pedagogy, serve to achieve competency-based educational goals, and ensure that students acquire language knowledge conceptually, perceptually, and practically in depth.

In primary school native language textbooks — in grades 1, 2, 3, and 4 — topics often consist of linguistic units such as sounds and letters, word structure, sentence structure, text meaning, and storytelling. Transforming these conceptual units into visual models through holograms:

creates opportunities for learners to perceive linguistic units spatially;

ensures the visualization and manipulation of semantic relationships;

simplifies understanding of the internal structural features of linguistic structures.

Sounds and letters: phonetics and graphics integration. The phonetic and graphic stage is the introductory section of native language textbooks and forms the basis for understanding the phonological system of the language. Methodological recommendations in research show that systematic knowledge in phonetics and graphics helps students deeply understand the specific characteristics of sounds, the differences between vowels and consonants, and their representation in writing. This knowledge strengthens the structural laws of language because sounds are the smallest semantic units of speech and serve as a foundation for mastering subsequent lexical and syntactic stages. Hologram technologies enrich this stage with visual experiential perception — sounds are presented in a spatial model, supporting perceptual learning by depicting their relationship with pronunciation and phonemic features. Interactive performance (for example, automatic sound playback when pressed) engages the learner in active participation, creating active phonetic experience rather than passive listening.

Word structure: morphemes and lexical analysis. In linguistics and native language methodology, studying word structures (root, affixes, derivation) serves to strengthen students' lexical and morphological knowledge. Mastering elementary concepts of word structure ensures understanding of lexical components and semantic differences, which increases vocabulary and enables analysis of language phenomena. Showing word models visually with the help of holograms allows learners to connect words spatially and semantically: for example, roots and affixes are displayed as 3D models, clearly illustrating their semantic interrelations. This strengthens visual understanding of lexical analysis and stimulates reflection.

Sentence structure: syntax and semantic relations. In language formation, the sentence is the most important element of speech, and studying its structure forms syntactic thinking. By teaching sentence parts (subject, predicate, object, attribute), students acquire logical analysis and understanding of grammatical relations. In Uzbekistan's native language curriculum, knowledge of sentence structure is provided systematically and each component is studied in relation to others. Hologram technologies present sentence elements as three-dimensional spatial schemes, making

logical systems easier to perceive. For example, sentence elements can be distinguished by colors or shapes, enabling visual analysis of their relationships and grammatical functions. This method strengthens reflective analysis skills and ensures deeper understanding of grammar application.

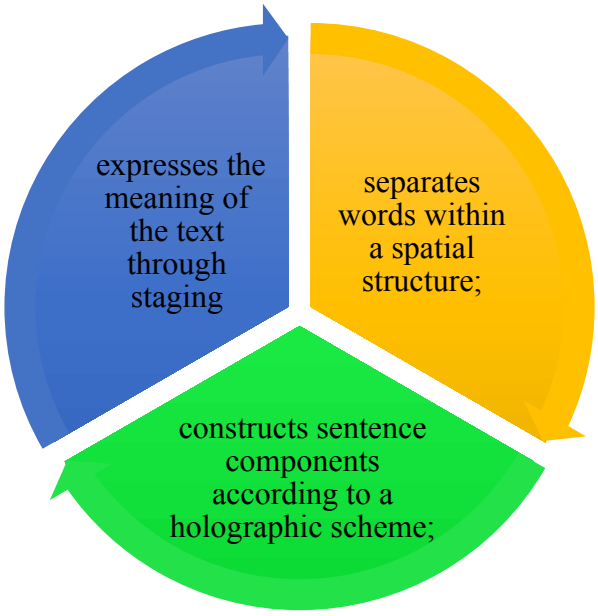
Text meaning and storytelling: semantic integration. Working with text is a process that comprehensively forms language competence; at this stage students gain skills of understanding text meaning, identifying the main idea, and expressing thoughts coherently. Tasks in native language textbooks on text meaning include listening comprehension, reading, and written expression exercises. A text staged with holograms — for example, sequence of events, character situations, or main idea — supports visual logical perception. The learner can analyze the scene and explain the development of events, which strengthens reflective analysis of oral and written expression. Such integration helps students perceive text meaning in a visual context and deepens storytelling skills.

Thus, integrating learning sections such as sounds and letters, word structure, sentence structure, and text meaning and storytelling with hologram technologies organizes the primary education process based on the principles of active interactivity, visual experiential perception, and reflective analysis. This approach serves to deeply and consistently develop students' linguistic and speech competencies and creates a modern multimodal and interactive methodological system for teaching the Uzbek language. At the same time, hologram scenes should be integrated with important textbook sections such as text, exercises, and explanations so that the learner analyzes the content through live visualization.

Methodological components of the model. The interactive lesson model is formed based on a multi-stage pedagogical mechanism:

Introductory stage — motivation and problem task. Introduction to the lesson topic is carried out through hologram scenes. For example, in a 1st grade lesson the topic "sound and letter" is introduced through a holographic letter-sound model, where the learner sees and analyzes a three-dimensional object resembling the sound of letters. This activates internal motivation regarding the topic.

Main activity stage — interactive learning. Based on hologram technology, the learner:



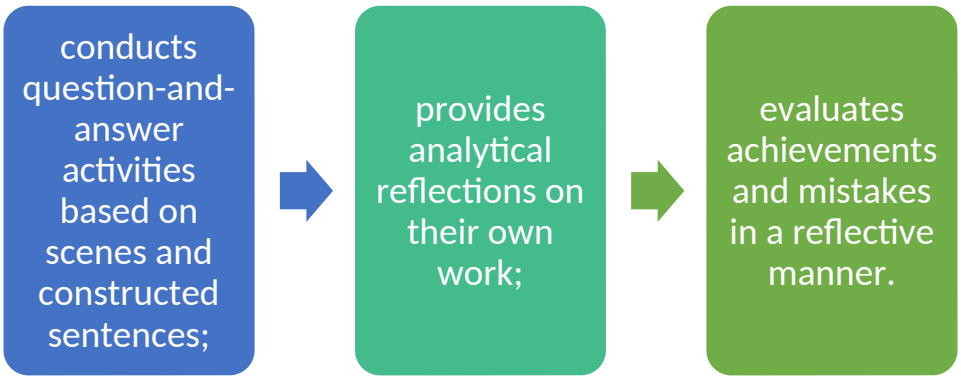
separates words within a spatial structure;

constructs sentence components according to a holographic scheme;

expresses text meaning through staging.

Each hologram element is dynamically linked to the textbook text, and the learner performs all interconnected steps: identifying the word → determining its function → placing it into the sentence structure. In this way, mastery of the content is ensured through active learning.

Analysis and reflection stage. At the end of working with the hologram, students:



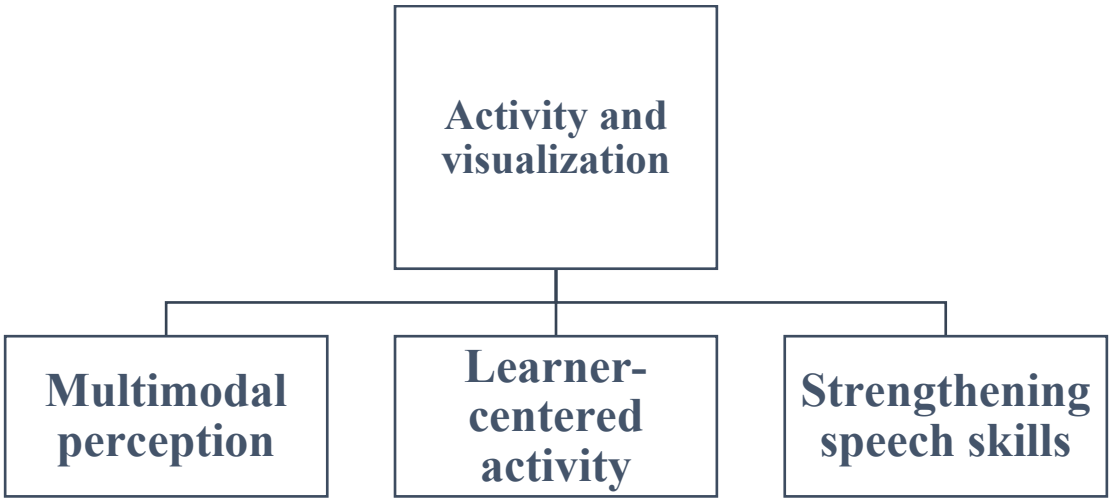
conduct question-and-answer activities based on scenes and constructed sentences;

provide analytical reflections on their own work;

evaluate achievements and mistakes in a reflective manner.

This stage serves to strengthen deep understanding of language knowledge.

Didactic effectiveness of the interactive lesson model. This methodological model ensures pedagogical effectiveness through the following aspects:



Activity and visualization – the learner directly interacts with linguistic content through the hologram. Multimodal perception – three-dimensional images, text, and audio elements together enrich the cognitive process. Learner-centered activity – each learner performs integrated exercises at their own pace. Strengthening speech skills – sentence construction, word analysis, and text creation are repeated through holographic situations, which deeply develops language competence.

This model not only introduces digital technologies but also transforms textbook content into a pedagogical process centered on learner activity, which fully corresponds to the didactic goals of the primary education curriculum. The interactive lesson model aims to activate the learner's language acquisition process through visual holographic tools. This approach integrates didactic principles (visualization, active participation, reflective analysis). Hologram technologies

strengthen students' cognitive perception by expressing language structures and grammatical systems in a spatial logical manner, which facilitates remembering and using language elements.

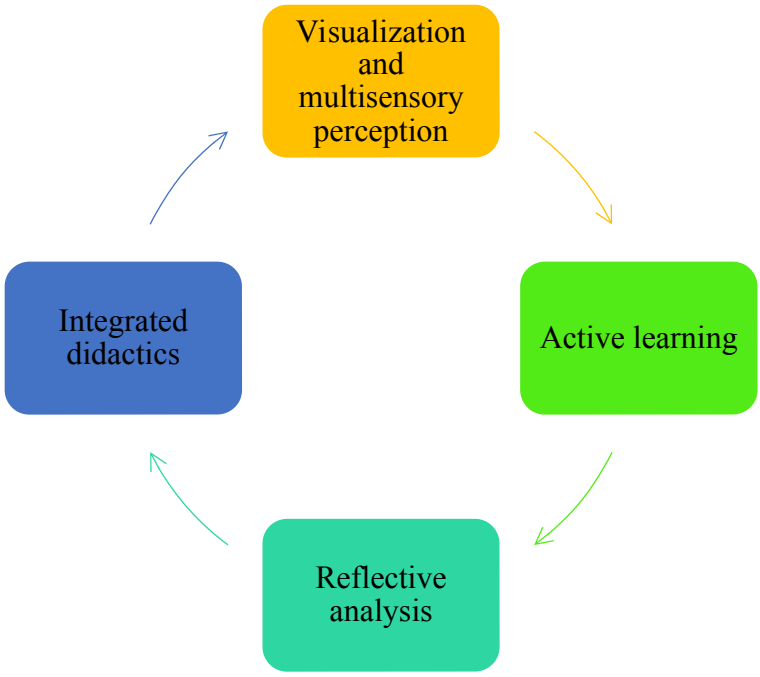
Through the methodological components of the interactive lesson model, using the example of sounds and letters in Grade 1 native language textbooks, sound and its corresponding letter are presented through hologram technology as a physical 3D image. For example, each vowel and consonant sound is formed in space within the hologram and its pronunciation is depicted through animation. Through this visual representation, the learner perceives the sound-letter relationship and applies them correctly in speech. This approach significantly strengthens didactic knowledge in phonetics.

Word structure and vocabulary, using the example of Grade 2 textbooks, the lexical meaning of a word, its morphological segments, and synonym–antonym relationships are represented through holographic models. The learner sees different semantic layers of a word in the hologram, organizes them according to context, and independently discovers new vocabulary units. At this stage, holographic complexes develop vocabulary and semantic analysis skills.

Sentence structure and syntax, using the example of Grade 3 textbooks, the functional roles of sentence parts (subject, predicate, object, attribute, etc.) are presented through a hologram in the form of a three-dimensional scheme. The learner visually places sentence elements, identifies syntactic relations, and correctly applies them in speech. This deepens syntactic thinking and enables conscious analysis of language structure.

Text analysis and speech activity, using the example of Grade 4 textbooks, text meaning is represented as a holographic scene: characters, time of events, and main idea elements are revealed in spatial scenes. The learner analyzes the scene and creates dialogues, short written expressions, and oral statements. Reflective question-and-answer tasks are also developed based on text meaning, which fosters contextual thinking.

Scientific and pedagogical characteristics of the interactive lesson model



Visualization and multisensory perception: The hologram integrates visual and audio elements, which directs students' attention and ensures deep understanding of language material.

Active learning: The learner interacts with holographic content, manipulates it, reconstructs it, and applies it in practice.

Reflective analysis: The learner continuously evaluates their own activity, analyzes text and vocabulary elements within context, and strengthens their speech by independently interpreting it.

Integrated didactics: Hologram technologies organically combine different language components (phonetics, lexicon, syntax, text) and transform the didactic process into continuous activity.

The interactive lesson model based on the use of hologram technologies transforms the content of Grade 1–4 native language textbooks into an effective visual, active, and contextual learning process. This model appears as an innovative pedagogical tool that ensures deep perception of language elements, formation of speech competence, and activation of cognitive activity. This approach serves to organize interactive, learner-centered lessons that correspond to the competency-based goals of primary education. The interactive lesson model based on hologram technologies deepens students' perceptual processes and increases learning effectiveness by transferring linguistic units from an abstract level to a spatial-visual level in primary native language education. The core components of the model — active learner participation, multimodal perception, and reflective analysis — serve to support students in independently constructing knowledge, evaluating their own activity, and comprehensively developing speech competencies.

This approach enables integrated teaching of the sections of Grade 1–4 native language content such as phonetics-graphics, lexicon and morphology, syntax, and text analysis. Presenting language units in a visual and interactive form through holographic models develops students' structural-logical thinking and ensures conscious mastery of grammatical concepts. Holographic visualization is also an effective tool for developing speech competencies: it strengthens oral speech through communication and dialogic situations, and written speech through text creation activities based on visual context. This forms students' skills in coherent expression of ideas, argumentation, and logical presentation. From a pedagogical perspective, this model fully corresponds to the principles of learner-centered and competency-based approaches, as it considers the learner as the central subject of the educational process and creates opportunities to organize learning activities according to individual pace and interests.

Conclusion

A multimodal and interactive environment strengthens students' learning motivation, enriches the educational process emotionally, and forms the need for independent learning. In addition, the use of hologram technologies serves to modernize the educational process as an innovative pedagogical system and appears as one of the important directions for updating primary education content under conditions of digital transformation. This model develops not only linguistic and speech competencies but also critical thinking, analysis of problem situations, and reflective learning skills. Therefore, the interactive lesson model based on hologram technologies is considered an effective pedagogical innovation in the primary education system and has significant scientific and practical importance in improving the quality of native language education, developing students' functional literacy, and forming individuals with modern competencies.

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DESIGNING AN EXERCISE–TASK SYSTEM AND DIDACTIC–METHODOLOGICAL REQUIREMENTS BASED ON THE VARK MODEL IN PRIMARY SCHOOL MOTHER TONGUE LESSONS

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Abstract. *This article scientifically and methodologically substantiates the necessity of organizing an exercise–task system multimodally in primary school mother tongue lessons on the basis of the VARK (Visual–Aural–Read/Write–Kinesthetic) model. The study analyzes the problem of relying on excessive grammarianism in mother tongue education, as well as shortcomings in developing students' reading comprehension, listening comprehension, and speech expression skills. The VARK model is considered as an effective tool for organizing lessons through different perceptual channels, differentiating tasks, and improving learning outcomes. In addition, based on primary school age characteristics, cognitive load management, UDL principles, and formative assessment mechanisms, the didactic–methodological requirements for lesson design are systematized. The research results show that creating a bank of multimodal tasks increases the effectiveness of mother tongue lessons and contributes to the development of students' speech competencies.*

Keywords: *VARK model, multimodal education, exercise–task system, mother tongue methodology, didactic requirements, primary education, speech competence, differentiated education, cognitive load, UDL.*

Introduction. Improving teaching in mother tongue lessons on the basis of the VARK model requires building an exercise–task system multimodally, taking into account students' perception and learning mechanisms. Although textbooks contain conventional symbols for activities such as "listening–reading–writing," systematizing them into a scientific–methodological framework based on VARK criteria—especially the issue of purposefully preparing future primary school teachers for this design competence—has not been sufficiently covered as a separate, complex object of research. The mother tongue is the main means of thinking, communication, and social adaptation in human life, and it plays a decisive role in understanding the world and achieving success in the educational process. However, in practice, mother tongue education is often observed to rely on excessive grammarianism, as a result of which students' reading comprehension, literate writing, listening comprehension, and speech expression skills do not form at the expected level. Therefore, the need has increased to update mother tongue methodology in line with the demands of the time, and to evaluate and develop educational outcomes through a competency-based approach in harmony with international assessments (PISA, PIRLS). In this process, it is important not to simply "copy and apply" the minimal requirements placed on mother tongue education (listening comprehension, reading comprehension, writing, speaking), but to creatively adapt them by taking into account the specific features of the mother tongue subject. Because in the mother tongue, merely reading or writing is

not enough: the student must perform complex cognitive actions such as understanding a text, constructing an idea, providing justification, and applying it in a communicative situation. Precisely at this point, it is necessary to free lesson content from excessive theoretical load and to develop a modern system of exercises and tasks that leads the student to active thinking. In this regard, distinguishing between the concepts of "exercise" and "task" is also methodologically important: an exercise is repetitive activity that serves to form skills and abilities, whereas a task is a didactic unit expressed in the condition part of an exercise that directs the learner toward a specific goal and activates thinking. Thus, in order to increase learning outcomes in mother tongue lessons, tasks should be designed as a "constructor" that encourages students to search and leads them to independent conclusions. From this perspective, the VARK model (Visual–Aural–Read/Write–Kinesthetic) serves as an effective didactic criterion in the methodological restructuring of mother tongue lessons. The VARK approach makes it possible to abandon one-sided delivery of learning material and to present it harmoniously through the channels of seeing (V), hearing (A), reading–writing (R/W), and practical action (K) in accordance with students' perception. This activates students in the lesson, deepens mastery, and increases interest in learning. In existing textbooks and curricula, tasks often appear in a form that leads students to a ready answer and is oriented toward formal-grammatical checking. As a result, questions such as "how many nouns are there?" and "which part of speech does it belong to?" may remain limited to identifying a fact rather than strengthening students' reading comprehension and speech competence. In such conditions, the most important part of the textbook should not be a database of theoretical information, but a bank of multimodal tasks that teaches students to use the possibilities of language appropriately and develops creative thinking. Therefore, using 1–4 grade mother tongue textbooks as an example, it is urgent to develop VARK-based exercise–tasks that systematize (1) visual supports, (2) auditory exercises, (3) processing through reading–writing, and (4) kinesthetic–practical activity, and to purposefully prepare future primary school teachers for this methodological design. In this, the VARK approach, along with organizing lessons in an interesting way, serves to determine criteria for developing reading literacy and speech competence and to steadily improve educational outcomes. In conclusion, in mother tongue education, student success depends not only on the content of the material, but also directly on which perceptual channel it is received and processed through. The conventional symbols in the 4th-grade textbook ("Listen," "Read," "Write," and others) indicate the need to harmonize various types of activity in the lesson process; however, the V and K channels are usually not sufficiently provided in "ready" form in the textbook and are strengthened through the teacher's methodological design. Therefore, improving a future primary school teacher's teaching in mother tongue lessons on the basis of the VARK model, first of all, requires (a) lesson design based on diagnosis, (b) increasing tasks according to V–A–R/W–K, and (c) strengthening the control–reflection mechanism. The VARK approach is not "dividing" the student into types, but serves to expand the methodological potential of learning tasks and to create a multi-channel didactic system that stimulates the student's interest in learning.

Didactic–methodological requirements for designing and organizing a lesson on the basis of the VARK (V–A–R/W–K) model in mother tongue (grades 1–4) lessons. Primary school mother tongue lessons are among the foundational subjects that shape the student's speech experience, thinking, and communicative competence. Therefore, in designing lessons in grades 1–4, the question "how is it taught and what result is obtained?" becomes more important than "what is taught?", and the didactic–methodological requirements are based precisely on the unity of result,

activity, and assessment. The VARK model (Visual–Aural–Read/Write–Kinesthetic) serves at this stage to build the lesson as a multimodal experience corresponding to different perceptual channels. Here, VARK is interpreted not as a tool for "teaching the student according to a single style," but as a means to reveal one topic in different forms, engage the student in active action, differentiate through different task pathways, and make assessment more transparent.

In determining the requirements for designing and organizing a lesson on the basis of VARK, three methodological criteria are important: (1) the specificity of educational content to the mother tongue subject (text, sentence, word, spelling, speech); (2) primary school age characteristics (short attention span, dominance of visual perception, learning through play, need for movement); (3) modern instructional design principles (cognitive load management, UDL, formative assessment, purposeful use of digital resources).[18] According to these criteria, the didactic–methodological requirements for designing and organizing a lesson in grades 1–4 mother tongue lessons on the basis of the VARK model are described in the following system.

1. Defining the goal and expected outcome through an "observable product." The lesson goal is expressed not abstractly ("mastering the topic") but through an observable outcome ("identifies the main idea of the text," "highlights sentence parts," "finds and corrects a spelling mistake," "explains the meaning of a word in context"). When the outcome is linked to a product, the teacher manages the lesson and the student finds an answer to the question "why am I doing this?" Products according to VARK should reinforce one concept in different forms without repeating each other: in V—diagram/table; in A—oral explanation and justification; in R/W—short written conclusion; in K—movement-based tasks such as classification, restoring sequence, role-play. Such an approach strengthens more visual–action products in grades 1–2 and also enhances explanatory–written products in grades 3–4.

2. "Coding" the topic according to VARK (topic → core concept → typical error → resource → activity → criterion). Mother tongue topics often look simple, but have many typical errors: in "text"—not noticing sentence cohesion; in "sentence"—not distinguishing a complete idea; in "word meaning"—not considering context; in "spelling"—forgetting the pronunciation–writing difference. Therefore, in the design process, the core concept and typical error are first identified, then V/A/RW/K resources are selected precisely in a way that serves to eliminate that error [20]. For example, in the 4th-grade topic "Types of texts," the typical error is confusing narrative/description/argumentation. V: comparative table; A: extracting evidence from an audio text; R/W: plan and conclusion; K: sorting mixed sentences by text type and defending the choice. Assessment criteria are also coded: correct identification, providing evidence, spelling–punctuation, logical coherence.

3. Building the lesson on the basis of micro-segments and planning VARK alternation. In primary school, dividing a 35–45-minute lesson into short blocks of 5–8 minutes, linking each block to one clear task, and changing the perceptual channel between blocks restores attention and strengthens mastery [18]. This requirement reinforces the "one resource—one goal" rule: listening to an audio text ends immediately with Q&A or retelling; a visual diagram becomes a support for written explanation. In segmentation, the "quick entry—quick product" method (2–3 minutes) is used more in grades 1–2, and the "concept—exercise—application" microcycle (6–8 minutes) is used in grades 3–4.

Thus, VARK works in the lesson not on the basis of "taking turns," but on the basis of "logical transition": V (support) → A (understanding) → R/W (reinforcement) → K (application) or other combinations.

4. Regulating cognitive load: reducing excessive decoration, highlighting the important, presenting in parts. Understanding VARK as “many resources” and presenting an image, video, long text, and many tasks at the same time distracts the learner. Cognitive load theory shows that working memory is limited and that unnecessary elements reduce learning. Therefore, requirements such as segmentation, signaling (highlighting keywords with color/symbol), reducing unnecessary information, keeping audio/video duration under 60–90 seconds, and not presenting more than 3–5 main units on one screen/page are included in lesson design. Especially in grades 1–2, visual supports are simplified: one diagram, one table, one image—and immediately one product.

5. Methodological requirements appropriate to the mother tongue subject for each VARK channel.

Requirement for V (visual): the visual should reveal the concept, not remain as decoration. In grade 1, matching picture–sentence, highlighting the capital letter and period with color; in grade 2, cluster (word groups); in grade 3, subject–predicate table; in grade 4, comparative table on text types are effective. In visual materials, main elements should not exceed 3–5, lines and symbols should serve the same meaning, and the text under the image should be minimal.

Requirement for A (aural): the listening comprehension task should be short, clear, and aimed at processing. For example, in grade 2, extracting 3 keywords from an audio dialogue; in grade 4, finding the “main idea—evidence” pair from an audio text and justifying orally. Cooperation (pair discussion) in the A channel increases learning motivation, but questions should require explanation rather than “yes/no.”

Requirement for R/W: not writing a lot, but writing with quality. In grade 1, one correct sentence; in grade 2, a 2–3 sentence mini-text; in grades 3–4, a 4–6 sentence narration or conclusion based on a plan. If R/W tasks are given together with spelling and punctuation criteria, the learner understands “why is it wrong?” and self-control skills form. “Metacognitive questions” (Which word did I write incorrectly? Why?) are also included in the R/W channel.

Requirement for K (kinesthetic): even if the “movement” is a game, its result should be linked to the concept. For example, in grade 2, matching synonym cards; in grade 3, placing sentence parts with colored cards; in grade 4, sorting mixed sentences by text type and defending the choice. If a small written note (“I chose this way because there is evidence”) is added at the end of kinesthetic activity, K and R/W integration occurs.

6. Differential and inclusive organization: multiple pathways for input and expression according to UDL principles. In one class, students’ reading speed, vocabulary, and phonetic sensitivity differ. Therefore, in a VARK lesson, 2–3 task pathways are offered with the same criterion: for example, the task “find the main idea of the text” can be completed by drawing a diagram for some, writing 2 sentences for others, and saying it orally for another. UDL recommends multiple options for “presentation—engagement—expression,” which supports individual needs in primary school. In addition, for students with slower language development, supporting words, a picture dictionary, and short sentence templates are given; for strong students, an expanded written task or a justification task is added.

7. Modern innovative organization: stations (Station Rotation), micro-content, QR-coded resource. Four VARK stations (V, A, R/W, K) are organized and students rotate every 5–7 minutes. One station can be digital and provide an audio text, mini-video, or interactive exercise via QR code. The station rotation model, as a practical form of blended learning, strengthens lesson management and individualized approach. The methodological requirement for using QR codes is

that the code should lead not to a "link" but to a product: listen → write 2 keywords; see → find 1 mistake; read → write 1 conclusion; do → make 1 example. Quick access via QR is shown as a tool to increase motivation and activity.

8. Forming a VARK task bank: the principle "one topic—4 channels—4 products." For topics in grades 1–4 mother tongue textbooks, ready constructions (templates) are created for V/A/RW/K: for text—cluster, audio questions, written conclusion, sequence with cards; for spelling—"find the mistake" poster, "pronunciation–writing" audio pair, editing dictation, "editing card"; for vocabulary—picture dictionary, dialogue, explanatory writing, matching game. The bank enables the teacher to design quickly, give differentiated tasks, and standardize control.

9. Formative assessment and reflection: rubric, checklist, "exit ticket." In a VARK lesson, assessment happens not only at the end, but throughout the process. For each channel, 2–3 clear criteria are set: in V—"diagram logic," in A—"justified speaking," in R/W—"spelling and meaning," in K—"correct classification and evidence." A 1-minute "exit ticket" at the end of the lesson (1 question–1 answer or 1 conclusion) strengthens the learner's self-assessment.

10. Requirements related to preparing future primary school teachers. In improving lesson design based on VARK, the student teacher's methodological competence is assessed through the following indicators: (a) linking the lesson goal to a product; (b) coding the topic and foreseeing a typical error; (c) balancing resources and activities across the 4 channels; (d) regulating cognitive load; (e) writing formative assessment criteria; (f) creating differentiated tasks suitable for grades 1–4; (g) enriching a textbook exercise with a VARK "extension." If the student teacher designs a micro-lesson based on these indicators, later in practice they move from "one topic—one method" to the principle "one topic—many channels—many products." Requirement for scientifically grounded use of VARK: the model should be interpreted not as "rigid adaptation" (only visual for the visual learner, only aural for the aural learner), but as a design tool that enriches teaching strategies, differentiates, and brings the learner into active participation. Research emphasizes that the idea of identifying "learning styles" and teaching only in a matched way (meshing/matching) has not been sufficiently proven, whereas in many cases it is more effective to consider which modality the content itself best fits. Thus, the methodological value of VARK in the mother tongue lesson is that it serves not to "label" the learner, but to reveal the topic in multiple forms, segment activity, support motivation, and make assessment more transparent. Modern pedagogical research shows that, in primary education, the effectiveness of learning activity largely depends on the degree to which the learner participates as an active subject in the educational process. Multimodal lessons organized on the basis of the VARK model help shape the learner not only as a receiver of knowledge, but as a person who processes, analyzes, and applies it in practice. This makes it possible to implement an activity-oriented approach in the educational process. A multimodal task system develops the learner's cognitive processes comprehensively. Through visual supports, the learner sees the logical structure of the topic; through aural activity, speech hearing and oral expression develop; through reading and writing tasks, semantic understanding deepens; and kinesthetic activity helps the learner reinforce knowledge through active movement. Such an integrative approach increases learners' cognitive activity and helps to firmly store knowledge in long-term memory. Also, multimodal lesson design makes it possible to pedagogically balance individual differences among learners. The harmonious use of different perceptual channels gives each learner an opportunity to understand the topic through a convenient pathway, which contributes to ensuring the principle of equal opportunities in education. As a result, learners gain confidence in their knowledge, participate more actively in the lesson process, and develop

independent thinking skills. From a pedagogical perspective, a task system developed on the basis of the VARK model increases the teacher's methodological mastery, because it requires designing the lesson on the basis of an integral link between clear goals, activity, and outcomes. In this process, the teacher appears not only as a transmitter of educational content, but as a manager and organizer of the learning process. In addition, the multimodal educational approach strengthens learners' intrinsic motivation for learning. Alternation of different activity types helps keep attention stable, strengthens the feeling of success, and forms a positive attitude toward the learning process. This creates a strong psychological foundation for learners' subsequent learning activity at the primary education stage. In general, applying a multimodal task system based on the VARK model in mother tongue lessons serves to improve the quality of the educational process, develop learners' speech and communicative competencies, and transform education into a learner-centered pedagogical environment. This approach emerges as one of the effective methodological directions in the modernization of primary education.

Conclusion. In conclusion, organizing an exercise–task system multimodally on the basis of the VARK model in primary school mother tongue lessons serves to improve educational effectiveness by taking into account learners' individual perceptual characteristics. This approach ensures learners' active participation by presenting learning material through different channels, reduces differences in mastery, and strengthens interest in learning. In designing lessons based on the VARK model, setting goals through observable outcomes, coding the topic, regulating cognitive load, developing differentiated tasks, and applying formative assessment mechanisms appear as important methodological requirements. Creating a bank of multimodal tasks enables the teacher to organize the lesson flexibly and to take into account each learner's needs. Also, the VARK model should be interpreted not as a means of rigidly classifying the learner into a fixed learning style, but as a methodological approach that enriches instructional design and organizes the lesson actively and interactively. Applying this model serves to develop learners' reading literacy, speech competence, independent thinking, and reflective analysis skills. Therefore, purposefully preparing future primary school teachers for the competence of designing lessons based on VARK is one of the important tasks of modern pedagogical education, and it enables organizing mother tongue education on the basis of a competency approach and steadily improving learning outcomes.

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PROFESSIONAL COMPETENCE OF ENGLISH LANGUAGE TEACHERS IN THE CONTEXT OF DIGITAL PEDAGOGY: A THEORETICAL AND PRACTICAL ANALYSIS

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Abstract. *The ongoing digital transformation of education has substantially redefined the professional profile of English language teachers, expanding competence requirements beyond traditional pedagogical and linguistic expertise. Contemporary educators are expected to design technology-mediated learning environments, critically evaluate digital resources, ensure ethical and responsible use of data and artificial intelligence tools, and engage in continuous reflective professional development. This study provides a theoretical and practical analysis of professional competence in digital pedagogy within English language teaching. Using a scoping review methodology guided by PRISMA-ScR principles, peer-reviewed studies from high-impact international journals were systematically analyzed to identify dominant conceptual frameworks, recurring competence domains, and pedagogical implications for teacher education. The findings reveal convergence across the literature around five interrelated domains of professional competence: pedagogical-technological design knowledge (TPACK-informed), digital assessment literacy, interactional and multimodal communication competence, ethical and critical digital literacy including AI awareness, and reflective adaptive expertise supported by institutional culture. Based on the synthesis, the article proposes an integrative competence model that conceptualizes digital professional competence as a dynamic and developmental construct rather than a static set of technical skills. The study also outlines practical implications for curriculum design, teacher training, and continuing professional development, emphasizing the importance of systematic integration of digital pedagogy into teacher education programs. The results contribute to the growing body of research on competency-based teacher education and provide a theoretical foundation for future empirical validation of digital competence frameworks in English language teacher preparation.*

Keywords: *digital pedagogy; English language teaching; professional competence; TPACK; digital competence; teacher education; AI literacy.*

Introduction. The professional competence of English language teachers has traditionally been framed through language proficiency, pedagogical knowledge, and contextual understanding of learners, curricula, and assessment. However, rapid digitalization has expanded professional expectations: teachers are now asked to orchestrate hybrid learning environments, select and adapt digital tools, create multimodal materials, and support learners' digital literacies. The pandemic period accelerated these expectations, but the shift is structural rather than temporary—digital pedagogy has become a stable feature of English language education worldwide. As Ertmer and Ottenbreit-Leftwich (2010, pp. 259–261) argue, technology integration reshapes teacher roles by linking competence with beliefs, institutional culture, and professional confidence.

A useful starting point for competence discourse is Shulman's notion of pedagogical content knowledge (PCK), which emphasizes that effective teaching requires more than subject

matter knowledge; it requires knowledge of how to transform content into forms learnable by students (Shulman, 1986, p. 9). Digital pedagogy extends this transformation process: teachers must design learning where technology is not merely an add-on but shapes tasks, interaction patterns, assessment modes, and access to resources. Building on this idea, Mishra and Koehler (2006, pp. 1025–1026) introduced the (TPACK) framework, which conceptualizes the interplay between content, pedagogy, and technology as a specialized knowledge base for teaching with technology . Subsequent reviews confirm that TPACK has become a central model for examining teacher competence in technology-enhanced instruction (Voogt et al., 2013, pp. 112–114).

At the same time, technology integration in teacher education remains uneven. Instefjord and Munthe (2017, pp. 40–42) highlight that "professional digital competence" is often acknowledged rhetorically but insufficiently embedded in coursework, mentoring, and assessment systems . Similarly, Tondeur et al. (2012, pp. 138–140) emphasize that preparing pre-service teachers requires coherent strategies—role modeling, authentic design tasks, reflective practice, and alignment between university coursework and school placements . In language teaching contexts, competence also involves managing interaction and multimodal communication. Hampel and Stickler (2005, pp. 314–316) demonstrate that online language teaching requires new pedagogical skills, while Kessler (2018, pp. 208–210) highlights the growing role of teachers as designers of digital learning environments.

In parallel, AI tools are increasingly embedded in educational platforms and language learning applications. Broader reviews of AI in education show fast growth in research and diverse applications , which makes it essential for teachers to develop AI-related pedagogical judgment and ethical awareness as part of professional competence (Wang et al., 2024).

Purpose and research questions. This article maps and synthesizes high-impact research to answer:

1. How is English language teachers' professional competence conceptualized under digital pedagogy?
2. What competence domains recur across empirical and review studies in leading journals?
3. What practice-oriented implications can inform teacher education and professional development?

Methods. A scoping review was selected to map a broad, interdisciplinary field and identify key concepts and gaps. The review and reporting logic followed PRISMA-ScR guidance (Tricco et al., 2018, pp. 469–470; Page et al., 2021). The review targeted peer-reviewed journal articles in high-impact outlets spanning teacher education, educational technology, and applied linguistics/CALL. Searches were conducted using combinations of keywords such as: *digital pedagogy*, *teacher competence*, *TPACK*, *language teacher education*, *online language teaching*, *technology integration*, *digital assessment*, and *AI in education*. Priority was given to studies indexed broadly and frequently cited (as an indicator of influence), while ensuring relevance to English language teaching and teacher competence.

The inclusion and exclusion criteria were designed to ensure that the review captures **high-quality, relevant, and theoretically grounded evidence** on teacher competence in technology-mediated education. Only peer-reviewed journal publications—covering empirical research, systematic reviews, meta-syntheses, and key conceptual contributions—were included to maintain methodological rigor and scholarly credibility. The focus was specifically on studies examining **teacher knowledge and competence**, particularly within technology-enhanced and language-

teaching contexts, and published in internationally recognized journals with strong citation impact. Sources were excluded if they were non-journal materials (e.g., policy reports, institutional documents, or book chapters) or if they examined learning outcomes without addressing the teacher competence dimension, ensuring alignment with the study's conceptual scope (see Figure 1).

Category	Criterion	Description
Inclusion	Peer-reviewed journal articles	Ensures academic rigor, reliability, and quality control through scholarly review processes.
	Types of publications	Empirical studies, systematic reviews, meta-syntheses, and influential conceptual papers were included to capture both evidence and theory.
	Topical focus	Studies examining teacher competence, knowledge, or skills for technology-mediated teaching, including language-teaching contexts, to maintain conceptual relevance
	Journal quality	Articles published in internationally recognized journals with strong citation visibility to ensure scholarly impact and credibility.
Exclusion	Non-journal sources	Policy reports, institutional guidelines, and book chapters were excluded to maintain consistency with a journal-based evidence base.
	Student-only focus	Studies addressing only student outcomes without analyzing teacher competence were excluded to keep the review aligned with its central research focus.

Figure 1. Inclusion and exclusion criteria

Results. Across the mapped literature, teacher competence in digital pedagogy converged around a set of interdependent domains rather than a single skill set. Five domains repeatedly appeared across general teacher-education research and CALL-oriented studies.

Pedagogical-Technological Design Knowledge (TPACK-informed competence)

Integrated pedagogical and technological knowledge is widely recognized as the core of digital teaching competence (Mishra & Koehler, 2006, pp. 1031–1032). Voogt et al. (2013, p. 116) emphasize that effective technology integration depends on teachers' ability to align digital tools with pedagogical goals. Tondeur et al. (2012, p. 142) further demonstrate that competence develops through structured design experiences rather than isolated ICT training.

Digital Assessment Literacy

Digital environments transform assessment practices by enabling multimodal evaluation and automated feedback. Instefjord and Munthe (2017, p. 44) note that teachers must develop assessment literacy that ensures validity and alignment with learning objectives in digital contexts.

Interactional and Multimodal Competence

Language learning relies heavily on interaction. Hampel and Stickler (2005, p. 318) show that online teaching requires advanced facilitation strategies, while Kessler (2018, p. 212)

highlights the importance of multimodal communication competence in technology-mediated classrooms.

Ethical and Critical Digital Literacy

Teacher competence includes evaluating digital resources and addressing ethical considerations such as data privacy and AI bias. Ertmer and Ottenbreit-Leftwich (2010, pp. 262–263) emphasize the role of beliefs and institutional support in shaping ethical technology use. Rapid developments in AI further reinforce the need for critical digital literacy (Wang et al., 2024).

Reflective and Adaptive Expertise

Professional competence is developmental and context-dependent. Research indicates that reflective practice and institutional culture significantly influence technology integration (Ertmer & Ottenbreit-Leftwich, 2010, p. 268).

Discussion. The synthesis supports the view that professional competence in digital pedagogy is best understood as an integrative construct. Shulman's (1986, p. 10) theory provides the conceptual foundation, while TPACK explains how technological knowledge interacts with pedagogical and content knowledge (Mishra & Koehler, 2006, p. 1035).

In language education, competence must also encompass interactional and communicative dimensions, particularly in online environments (Hampel & Stickler, 2005, p. 320). Based on the findings, an integrative competence model includes instructional design, digital assessment literacy, ethical digital awareness, and reflective expertise. The proposed integrative model (see Figure 2) conceptualizes competence as four interrelated layers.

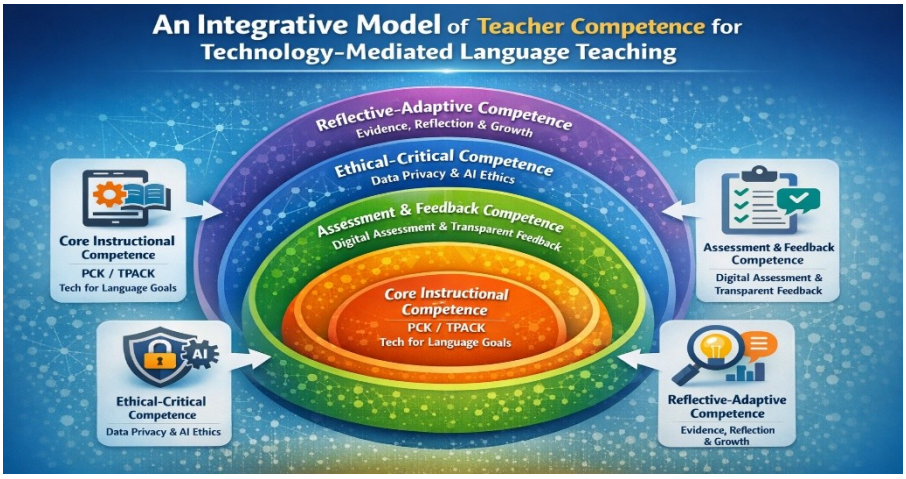


Figure 2. An integrative model of teacher competence for technology-mediated language teaching (Created by the author using ChatGPT (OpenAI), 2026).

Implications for teacher education (initial preparation)

The mapped literature suggests that teacher education programs should embed digital competence systematically through design-based assignments and mentoring (Tondeur et al., 2012, p. 144). Instefjord and Munthe (2017, p. 45) emphasize that professional digital competence should be integrated across curricula rather than treated as an additional module.

Evidence-supported strategies include:

- **Design-based assignments:** Pre-service teachers create technology-integrated lesson sequences with explicit justification linked to pedagogy and language outcomes (TPACK-aligned). Synthesis work indicates that authentic design tasks and reflection are central to preparation .

- **Role modeling and mentoring:** Programs should ensure teacher educators and mentor teachers model effective digital pedagogy; professional digital competence must be visible in practice .
- **Online interaction training for language teaching:** Structured modules on facilitating online discussion, feedback, and multimodal interaction reflect the "new skills" required in online language environments .

Implications for continuing professional development (CPD)

Teacher competence is sustained through ongoing learning. Practical options aligned with the literature include:

- **Micro-credentialing and evidence portfolios:** Teachers collect artifacts (lesson plans, recordings, feedback samples) and annotate them reflectively.
- **Belief-aware CPD:** Because teacher beliefs and confidence mediate technology integration, CPD should address pedagogical reasoning and identity, not only tool training.
- **AI literacy embedded in pedagogy:** CPD should support teachers to (a) evaluate AI outputs critically, (b) teach students responsible use, and (c) design assessments that reduce inappropriate reliance on AI while supporting learning.

Limitations and future research. This scoping review mapped influential peer-reviewed literature but did not conduct meta-analysis or evaluate effect sizes. Future studies could:

- empirically validate the proposed competence model in pre-service EFL populations;
- develop performance-based rubrics for digital pedagogy in English language teacher education;
- investigate how AI-mediated feedback and assessment reshape professional competence requirements.

Conclusion. English language teachers' professional competence under digital pedagogy is best understood as an integrated system combining pedagogical-technological design knowledge, digital assessment literacy, interactional competence for online/multimodal communication, ethical-critical digital (and AI) literacy, and reflective adaptive expertise sustained by supportive institutional culture. The international literature consistently indicates that competence grows through coherent program design—role modeling, authentic design tasks, mentoring, and reflection—rather than through standalone "technology" training (Voogt et al., 2013; Tondeur et al., 2012).Teacher education and CPD should therefore operationalize competence through performance evidence, structured reflection, and ethically grounded digital practice.

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DIRECTIONS AND FUNCTIONS OF FORMING PROFESSIONAL PEDAGOGICAL THINKING IN FUTURE TEACHERS

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Abstract. *This article analyzes the problem of forming professional thinking in future teachers based on the knowledge-oriented paradigm and competency-based approach in modern education. The study highlights the difficulties encountered in the professional and personal development of future teachers, including insufficient ability to distinguish professionally significant information, independently systematize pedagogical knowledge, and develop critical and reflective thinking skills. Furthermore, the didactic potential of quasi-research technologies in developing professional pedagogical thinking and the advantages of their application in real educational environments are substantiated. The article reveals the possibilities of developing evidence-based decision-making, reflective thinking, and pedagogical research competencies in future teachers through such methods as case studies, microteaching, simulation, and reflective writing. The research findings demonstrate the necessity of systematically developing professional thinking in future teachers in accordance with state educational standards and qualification requirements.*

Keywords: *future teacher, professional thinking, competency-based approach, quasi-research technology, quasi-experiment, reflective thinking, pedagogical competence, professional training, microteaching, case study.*

Introduction

In modern education, the development of a knowledge-oriented paradigm — that is, an approach based on forming motivation for acquiring knowledge — and the support of striving to master competencies are being observed. This actualizes the problem of preparing future teachers as individuals capable of self-development and self-realization, independently making well-grounded decisions in non-standard situations, critically evaluating existing experience, acquiring flexible skills and abilities, and engaging in systematic pedagogical thinking.

These directions are reflected in the Law of the Republic of Uzbekistan “On Education,” the Presidential Decree approving the Concept for the Development of the Higher Education System of the Republic of Uzbekistan until 2030, and the “Uzbekistan–2030” Strategy. The relevance of forming professional thinking in future teachers is also confirmed by innovative research focused on personal approaches to professional activity, pedagogical orientations, the search for the essence and significant aspects of the profession, the ability to distinguish and comprehend professionally significant information, and the independent systematization of professional knowledge.

Our observations show that 32% of future teachers possess the ability to distinguish professionally significant information, 25% are capable of independently selecting and mastering pedagogical knowledge, and 15% understand the substantive interconnections among pedagogical disciplines. Evidently, the majority of future teachers face difficulties in their professional and

personal development. They experience challenges in mastering methodologies that support professional thinking as a structural component of intellectual development, as well as in forming a holistic understanding of pedagogical processes and cognitively oriented professional knowledge based on modern scientific approaches.

A retrospective analysis of pedagogical and psychological literature indicates that the formation of professional pedagogical thinking in future teachers should be carried out in accordance with higher education qualification requirements. This necessitates the development of theoretical foundations, programs, and teaching technologies aimed at fostering professional thinking. The issue has been partially addressed in the works of R. Safarova, N. Muslimov, B. Xodjaev, B. Ma'murov, D. Oxunova, M. N. Naumenko, L. S. Sagatelova, and T. N. Kriskovets.

During the process of professional training, it can be observed that future teachers encounter certain difficulties in adequately responding to various information flows reflected in professional situations, as well as in distinguishing and systematizing professionally significant aspects. According to state educational standards and qualification requirements, it is of particular professional importance to develop the following in future teachers:

- systematic and critical thinking for the purposeful organization of pedagogical processes;
- the ability to conduct critical analysis based on a reflective approach;
- skills for developing strategies of professional action.

For this purpose, the use of quasi-research technology is of particular importance. Quasi-research technology is most often applied in the form of quasi-experimental research. It represents a type of research aimed at evaluating the effectiveness of pedagogical interventions, innovations, methods, technologies, courses, or training programs in situations where random assignment of participants to groups is not feasible.

Quasi-research technology is grounded in its own theoretical and conceptual foundations. In quasi-research, ensuring the reliability of results requires careful assessment of validity, commonly referred to as the typology of validity. Quasi-technologies play a distinctive role in measuring professional thinking. In this context, case analysis, microteaching situations, and reflective writing are applied, while pedagogical reasoning, levels of reflection, and professional decision-making skills serve as indicators of professional-pedagogical thinking.

The effectiveness of quasi-technology in forming professional-pedagogical thinking among students becomes particularly evident in higher pedagogical education institutions, where fixed curricula and ethical constraints often limit the possibility of conducting fully randomized experiments. Therefore, the quasi-experiment possesses significant pedagogical value as the most appropriate approach for assessing the effectiveness of interventions within real educational environments.

Professional pedagogical thinking manifests itself in the ability to interpret teaching as an intellectual activity, to comprehend its essence and content, to adapt learning situations to students' developmental levels, to select effective methods, to objectively assess learning outcomes, and to reflect upon and redesign pedagogical processes.

Quasi-research technology contributes to the development of competencies such as evidence-based decision-making, reflective thinking, analysis of one's own practical pedagogical activity, project-based problem solving in pedagogy, and the cultivation of a pedagogical research culture. This includes the application of innovative methods, understanding sociometric

relationships between teacher and student, and conducting precise analyses of pedagogical situations.

A quasi-professional educational environment is also regarded as a setting approximating real teaching practice. It incorporates elements such as microteaching, simulation, case studies, and internships. Such an environment facilitates the development of pedagogical thinking and its structural components, including cognitive, creative, and research skills. The formation of pedagogical thinking among students is reflected in the projects they develop, the sources they utilize, and the exemplary works they produce.

Within the framework of quasi-research methodology, professional pedagogical thinking is formed through game-based learning processes aimed at mastering pedagogical knowledge. At the same time, reflective thinking is cultivated in future teachers through didactic game situations. Furthermore, organizing pedagogical situations in which the quasi-experimental method is applied — particularly through reflective writing — plays a significant professional role in strengthening critical thinking skills.

It is essential that future teachers develop the ability to analyze and generalize, to determine the priority directions of their pedagogical activity, and to apply methods for improving professional thinking based on the evaluation of their professional knowledge and continuous learning. The above requirements indicate the necessity of conducting specialized research into the formation of professional thinking in future teachers within the process of professional training.

In turn, this ensures that future teachers acquire an understanding of the necessity of professional thinking, enrich their perceptions of the pedagogical process, and develop firm positions, viewpoints, and systems of attitudes toward themselves, their students, and their chosen profession. In other words, the primary condition for forming professional thinking in future teachers lies in their professional and personal development in accordance with state educational standards and qualification requirements. They must consciously comprehend the diversity of pedagogical processes, be capable of accepting and understanding new knowledge, and possess the ability to identify the most significant and stable relationships within their future professional activity.

In pedagogical and psychological research, broad approaches to the concept of “training future teachers” can be observed. Some scholars interpret it as a goal-oriented process consisting of the joint activities of educational subjects (R. Safarova, B. Xodjaev, B. Ma’murov, D. Oxunova, V. V. Serikov). Others consider it a purposeful process of professional training (N. Muslimov, B. Ma’murov, A. K. Markova, M. L. Mitina), while another perspective emphasizes the development of professional self-awareness in the future specialist (S. L. Rubinstein, V. I. Slobodchikov).

One of the distinctive features of professional training for future teachers is ensuring their cognitive mastery of knowledge, the formation of professional thinking, and the acquisition of practical experience in applying professional skills, all of which are realized directly within the educational process. The well-known specialist A. P. Bulkin successfully distinguished between the goals and functions of teacher training and professional education. At the same time, many scholars define professional training of future teachers as preparing students to fulfill professional tasks and develop professional competencies. Among them are M. I. Dyachenko and L. A. Kandybovich.

In order to scientifically investigate the problem of forming professional thinking in future teachers, it is first necessary to analyze the essence of the concept of “professional training.” Professional training represents a dynamic system of professional knowledge development, a body

of knowledge required to master professional activity, and a process that ensures readiness for pedagogical activity. It reflects the level of purposeful acquisition of pedagogical knowledge, skills, and abilities. Accordingly, professional training can be regarded as an indicator of the formation of personal-professional experience emerging through the joint activities of professors and students.

Conclusion

In the process of forming pedagogical thinking in future teachers, it is necessary to teach students to search for and comprehend the essence of professionally significant information. This expands their opportunities to master academic and professional tasks. The transition from assimilating professionally significant information to selecting and transforming it involves readiness to understand pedagogical tasks, choose an appropriate professional style, and develop skills for solving professional problems.

At present, the tasks of forming professional thinking in future teachers include:

1. Improving the quality of professional training of future teachers;
2. Enriching the content of curricula and academic modules aimed at developing professional thinking;
3. Developing research skills through quasi-technologies to foster professional thinking;
4. Expanding the practical directions of the professional thinking formation process.

The successful implementation of these tasks requires the development of methodological support for the systematic application of technologies aimed at enhancing professional thinking in future teachers.

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CHILD DEVELOPMENT: ISSUES OF EDUCATION AND INCLUSION

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Abstract. *In the content of the article, broad opinions are given about the content of thoughts of thinkers in the upbringing of the child, the problems of the individual and his development in education, the role of upbringing in the maturation of the individual, inclusive education, the upbringing of the perfect generation. Detailed information is given about upbringing, the fact that it is a continuous process, that upbringing is in the highest place in a person's life, the relevance of inclusive education in current education reforms, the life skills of children and its importance in the life of a child.*

Keywords: *upbringing, personality, student, educator, science, school, teacher, inclusive education.*

INTRODUCTION

It expresses the fundamental idea of our reforms aimed at shaping the modern face of our country, establishing a democratic state and a free civil society, and creating the foundation for the third Renaissance. It is no coincidence that, based on this idea, the slogan “New Uzbekistan – towards the Third Renaissance” is being promoted in our country.

Every society, nation, and people has its own customs, morals, and codes of conduct. One of the most important duties of teachers and parents is to instill national customs, morals, and codes of conduct in future generations. Education is a continuous, uninterrupted process of psychological and pedagogical significance that cannot be delayed. In this process, the future destiny of a person, as well as the destiny of the society and system directly related to the person, can be determined. The New Uzbekistan strategy, the implementation of noble intentions, and unparalleled changes in building a new life demand from all of us dedication, creativity, and even greater devotion.

LITERATURE ANALYSIS AND METHODOLOGY. The Decree of the President of the Republic of Uzbekistan dated November 6, 2020, No. PQ-4884 “On additional measures to further improve the education system,” and the Decree of the President of the Republic of Uzbekistan dated November 6, 2020, No. PF-6108 “On measures to develop education, upbringing, and science in the new era of Uzbekistan’s development” set out a number of reforms in the education and upbringing system. The essence of these reforms is focused on the issues of student upbringing and the development of education.

On January 28, 2022, the President of the Republic of Uzbekistan adopted Decree No. 60 “On the Development Strategy of the New Uzbekistan for 2022–2026.” This decree was developed as a continuation of the “Action Strategy on five priority areas of development for 2017–2021.” Decree No. 60 “On the Development Strategy of the New Uzbekistan for 2022–2026” sets out 100 goals, among which Goal 70 is titled “Improving State Policy on Youth.” It defines the task of assisting youth in achieving spiritual, intellectual, physical, and moral development. It also sets the task of educating youth as individuals with patriotism, civic awareness, tolerance, respect for laws, national and universal values, capable of resisting harmful influences and currents, and possessing

firm beliefs and attitudes toward life. Thus, it is clear that the priority policy of our state is directly related to the life and destiny of young people. Clause 5 of the decree defines ensuring spiritual development and taking the sphere to a new level. This shows that spirituality remains relevant today and continues to be a priority in state policy. It outlines a number of tasks:

- Preserving, promoting, and developing the national values and spiritual heritage of the Uzbek people, supported by the state;
- Ensuring the continuity of spiritual upbringing in families, educational institutions, and communities;
- Developing scientifically based indicators for assessing spiritual upbringing;
- Applying interactive methods of education and upbringing to make schools true centers of spirituality, enlightenment, and culture;
- Combating ideological attacks based on national ideas, strengthening cooperation among family, school, and community, and thereby developing the skill of ensuring the continuity of spiritual upbringing.

The implementation of this decree demonstrates our efforts to educate future generations to be spiritually healthy and mature, expand the spiritual layer, which is an important indicator of society and state development, ensure the cooperation of communities and organizations in this area, and take steps to develop the spiritual image at a new stage in the Third Renaissance.

DISCUSSION AND RESULTS. Upbringing is a priority task in the life of the country. A country that does not sufficiently engage in the upbringing of the younger generation will not progress. After all, any society needs to produce material and spiritual wealth for growth and development. For this, the younger generation must be able to develop spiritual wealth at the level of their ancestors, or even better. Having an effective upbringing system is important for shaping such material and spiritual abilities in the younger generation. Education cannot be separated from upbringing, just as upbringing cannot be separated from education; in a rapidly developing era, upbringing must underlie education. It is appropriate for science to be conducted based on education and upbringing. Moreover, the purpose of every teacher and instructor in providing education is to nurture a generation with a bright future, serving the nation and homeland, and such education and upbringing will inevitably be effective. That is, today’s teacher must educate their students with dedication and be a committed mentor.

From the above, it is evident that responsibility in upbringing always depends not only on parents but also on the efforts of skilled and scientifically capable teachers. It is important to know not only the forms of organizing work but also the proper ways to conduct it.

The most important tools in upbringing are love and gentle speech. These two tools together honor the child. Education should also not be carried out with anger or punishment. Knowledge forced upon a child is quickly forgotten, and as a result, the child may lose interest in the subject. Thus, education begins with proper upbringing and manners.

The content of modern upbringing is a combination of knowledge, skills, abilities, and qualities that learners must acquire according to set goals and tasks. The main ideas of upbringing are: upbringing goals, the relationship between the object and the subject, finding one’s own path, and the educator’s focus on personal and collective orientation. The content of modern upbringing consists of knowledge, skills, abilities, and qualities, which learners must acquire according to goals and tasks.

When defining the goals of upbringing, it is important to implement upbringing tasks, content, tools, forms, and methods, as well as self-upbringing. The pedagogical interaction between the educator and the learner is carried out through emotions.

Wide opportunities are being created for the younger generation to grow up fully, and many beneficial activities are being implemented. These include social protection of mothers and children, creating a healthy family environment and lifestyle, organizing children's free time properly, involving them in sports and additional education, health-improving and preventive measures, vocational guidance, and nurturing a comprehensively developed mature individual. The effectiveness of education and upbringing depends on cooperation with the family. The proper upbringing of a child and fostering their moral and spiritual development is directly related to the parents' sense of high responsibility. The content of upbringing is based on the best traditions in Uzbek families and is also reflected in the education and upbringing provided by communities, families, and educational institutions. Expected results can only be achieved when family upbringing is closely linked with social upbringing.

Thus, the role of fathers in forming healthy family relationships and raising children as mature and complete individuals is invaluable. Every person's greatest treasure in life is their children. Every parent wishes to raise their child well, realize their dreams, and achieve high goals. These wishes do not come true on their own. In such situations, parents must be extremely careful and attentive in upbringing. Only by faithfully fulfilling their duties can they achieve the intended goals.

One of the directions of development in Uzbekistan's education is the introduction of inclusive education in general education schools. Inclusive education is a system that ensures every child, including those with disabilities, developmental disorders, in need of social protection, or with other special needs, receives education on an equal basis in general education institutions. This approach is based on human rights, equality, and anti-discrimination principles.

The main goal of inclusive education is to create equal opportunities for all children, taking into account their physical, intellectual, social, and educational needs. This system fosters tolerance, unity, mutual respect, and equality in society. Inclusive education also plays an important role in ensuring children's independence, social activity, and adaptation to the labor market. In recent years, systematic reforms have been implemented in Uzbekistan to introduce inclusive education:

Legal norms have been developed for organizing inclusive education based on learners' social needs and personal interests, ensuring a strong integration of science, education, and production.

To organize inclusive education for children with special educational needs, it is necessary to strengthen the material and technical base of educational institutions, adapt curricula, expand access to quality health-improving educational services, and train highly qualified personnel for this process. Solving socio-pedagogical issues requires mutually beneficial cooperation among education, healthcare, and community organizations to provide quality educational services to children with limited abilities.

In 2020, the "Concept for the Development of Inclusive Education for 2020–2025" was adopted by presidential decree. Special teachers and psychologists were trained, and professional development courses were organized. Methodical and technical support tools for inclusive education (audio books, ramps, visual guides, etc.) are being implemented. Inclusive education today is important not only for children with special needs but for society as a whole in social,

educational, and humanitarian terms. Reforms and legal-organizational conditions in Uzbekistan in this area will create a foundation for fair and quality education for all children in the future.

Inclusive education is organized through differentiated teaching, adapted assignments, individual development plans, and tailored teaching materials. This primarily creates a favorable environment for such children and provides conditions for utilizing their abilities in various ways. A comfortable environment helps children quickly find their place in society like healthy children and become beneficial members of society. Abu Rayhan Beruni identified three factors in human perfection: environment, upbringing, and heredity. Thus, the environment plays a significant role in determining what kind of person a child will become. The comfortable environment and effective approaches created for inclusive children ensure their bright future.

In the future, every school's ability to accept children with diverse educational needs is one of the main goals of inclusive education. This not only causes changes in school structure and operations but also changes the mindset of teachers in general and special education institutions who have been accustomed to working with only certain groups of children. Modern pedagogical traditions operate based on approaches that place the learner at the center of the educational process, requiring teachers to be ready to meet the needs of all children.

CONCLUSION. In the process of pedagogical cooperation, a child forms and develops as a personality. Together with the interests, demands, aspirations, and enthusiasm of the individual and the community, they take steps toward perfection. In general, the basis of the goal of upbringing is to nurture a morally high, comprehensively developed, and patriotic individual. The management of the upbringing process plays an important role in the activities of teachers. In modern pedagogy, upbringing is not simply the educator's influence on the learner but the relationships and interactions between educators and learners directed toward a specific goal and conducted cooperatively. Today, it is not only about raising a person with knowledge but also about educating a creative, talented, and enterprising individual.

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THE ROLE OF MONTESSORI PEDAGOGY IN PRESCHOOL EDUCATION AND ITS SIGNIFICANCE IN THE COMPREHENSIVE DEVELOPMENT OF CHILDREN

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Abstract. *This article discusses the necessity of implementing Montessori pedagogy in preschool educational institutions and examines its significance in the comprehensive development of children of preschool age. The study highlights the role of the Montessori method in fostering cognitive, sensory, emotional, and intellectual growth through a child-centered and developmentally appropriate learning environment. Particular attention is given to the principles of freedom of choice, individual approach, and learning through sensory experience as fundamental components of early childhood education. The article emphasizes the importance of creating a supportive and developmentally enriching environment that promotes independent thinking, imagination, and active engagement in the educational process.*

Keywords: *thinking, freedom, sensory development, activity, teaching and learning process, imagination, intellectual attitude, sensory organs, freedom of choice, individual approach, developmental environment, cognitive development, early development, emotion, reflection, concept, mental phenomenon, learning through sensory perception.*

Introduction

At present, providing children with comprehensive and high-quality education and upbringing is considered one of the most pressing issues not only for parents but also at the level of state policy. Since 2016, particular attention has been paid to the systematic reform and development of preschool education, which constitutes the foundational stage of the national education system.

In this regard, Resolution No. 802 of the Cabinet of Ministers of the Republic of Uzbekistan, dated December 22, 2020, entitled “On the Approval of the State Standard for Preschool Education and Upbringing,” was adopted. The primary objective of this Resolution is to organize the preschool education system in accordance with modern requirements, to ensure the healthy and well-rounded development of children, and to introduce effective forms and methods of teaching and upbringing into the educational process. Furthermore, the Resolution aims to foster a spiritually mature generation and to establish and monitor mandatory minimum requirements concerning the scope, content, and quality of the educational process; the construction and equipment of preschool educational institutions; as well as the organization of healthy nutrition and safety for preschool-aged children.

The purpose of the State Standard reflects a comprehensive approach to the organization of preschool education based on contemporary pedagogical principles. It emphasizes the importance of implementing effective educational strategies, ensuring quality assurance mechanisms, and adopting advanced practices derived from the experience of developed countries in the field of early childhood education. Consequently, the system envisages a modern, child-centered approach

to the education and upbringing of preschool-aged children, aligned with international standards and developmental priorities.

Literature review

Logical thinking is defined as the ability to distinguish between possible and necessary conclusions. It constitutes an essential component of mathematical and scientific reasoning and plays a significant role in navigating the complexities of social and political life. Therefore, understanding the developmental mechanisms of logical thinking is of considerable importance in both theoretical and educational contexts.

The research and practical experience of prominent methodologists and psychologists, such as Pyotr Galperin, Nina Talyzina, and A. V. Beloshistaya, demonstrate that the foundations of logical thinking can be formed as early as the ages of three to four, provided that age-related characteristics are taken into account. Furthermore, by the age of six to seven, logical thinking skills can reach a relatively high level of development. The preschool period is considered the most sensitive and psychologically favorable stage for mastering basic logical operations. During this period, children gradually acquire the ability to perform fundamental logical tasks and develop reasoning skills that serve as a foundation for subsequent stages of formal education.

The formation of elementary logical thinking skills in preschool children is a prerequisite for their successful education and upbringing. The ability to actively process information through logical reasoning, rather than relying solely on memory, expands the didactic potential of organizing educational activities based on the principles of Montessori pedagogy. Logical thinking should not be regarded as an innate and naturally developed capacity; rather, it evolves progressively at different stages of childhood, expanding and becoming more complex as the child matures.

Preschool age represents a crucial stage in the comprehensive formation of the child as a personality. It is during this developmental period that the foundations of cognitive, physical, social, and emotional growth are established. Among contemporary pedagogical approaches, Montessori pedagogy occupies a distinctive place in preschool education.

The central principle of Montessori pedagogy is expressed in the idea: “Help me to do it myself.” Within this framework, the child is regarded as the central figure of the educational process, while the teacher assumes the role of guide and observer. Montessori pedagogy, developed by Maria Montessori, is grounded in the principle that adults should not perform tasks on behalf of the child but instead create conditions that enable the child to act independently. This approach aims to cultivate self-reliant, free-thinking, and responsible individuals through a child-centered educational environment.

Research methodology

In the course of the study, a set of theoretical and empirical research methods was employed. These included the review and analysis of scientific and methodological literature, pedagogical observation, interviews, questionnaires, expert evaluation, analysis of activity outcomes, surveys, pedagogical experimentation, as well as methods of mathematical and statistical analysis.

The systematic application of these methods ensured the reliability, validity, and objectivity of the research findings and enabled a comprehensive examination of the role of Montessori pedagogy in preschool education and its significance for the holistic development of children.

Analysis and Results

The fundamental principles of Montessori pedagogy include the following:

- the child's right to freedom of choice;
- an individual approach to learning;
- a specially prepared developmental environment for children;
- self-control and self-assessment;
- learning through movement and active engagement.

Within the framework of the Montessori Method, the environment created in preschool educational institutions facilitates the organization of the learning process in accordance with children's natural interests and developmental needs. The classroom is specifically arranged based on Montessori principles, and all didactic materials are systematically organized in alignment with the children's age and level of development. Such a carefully prepared environment provides children with opportunities for independent activity and self-directed learning.

Montessori pedagogy minimizes traditional practices based on coercion and excessive restriction. As a result, it strengthens children's intrinsic motivation toward learning. At the same time, it enables educators to organize the educational process in a more engaging and effective manner, thereby creating favorable conditions for meaningful knowledge acquisition and holistic development.

The significance of Montessori pedagogy in the comprehensive development of children

The importance of Montessori pedagogy in fostering the holistic development of children can be observed in the following dimensions:

1.Cognitive development.

Montessori materials promote the development of logical thinking, comparison, analysis, and problem-solving skills. Through engagement with these materials, children learn to identify and correct their own mistakes independently, thereby strengthening reflective thinking and intellectual autonomy.

2.Physical development.

Activities designed to enhance both fine and gross motor skills such as tasks involving small objects, as well as physical movements including walking, running, and jumping contribute to the improvement and consolidation of children's coordination and overall physical development.

3.Social development.

Social development is fostered through interaction in mixed-age groups, where children learn to assist one another, develop mutual respect, cooperate effectively, and assume responsibility within the group. The fundamental principle of Montessori pedagogy freedom within a structured environment encourages children to act based on the knowledge, skills, and competencies they have acquired. This process supports the stable formation of self-confidence and social responsibility.

4.Emotional and volitional development.

Montessori pedagogy contributes to the development of patience, self-confidence, independence, and internal discipline. The structured yet flexible learning environment enables children to regulate their behavior and emotions, thereby strengthening their volitional qualities.

5.Moral and aesthetic education.

Pedagogical freedom within the Montessori environment creates favorable conditions for the early formation of moral values. Children develop a sense of responsibility for completing assigned tasks independently. Within an orderly and carefully structured environment governed by

clear rules established by adults, children learn to adhere to moral and aesthetic norms. Such an environment cultivates an appreciation for cleanliness, order, harmony, and beauty.

A distinctive feature of Montessori pedagogy lies in its capacity to promote early childhood development naturally and without coercion. It encourages independence from an early age: children learn to eat independently, dress themselves, organize their belongings, and make choices regarding their activities. This approach fosters self-reliance and consistently strengthens children's self-confidence while simultaneously accelerating cognitive development.

Through specially designed Montessori materials, children learn to differentiate and compare colors, shapes, and sizes, which further stimulates logical reasoning. An additional significant aspect of this pedagogical approach is its positive influence on early language development. Children expand their vocabulary, learn the names of objects, and develop fluent speech within an environment that encourages free expression.

Sensory development occupies a central place in Montessori pedagogy, as learning occurs primarily through sensory experience. During Montessori activities, children frequently manipulate objects with their hands, which enhances sensory perception and contributes to sustained attention and concentration.

Conclusion

In conclusion, Montessori pedagogy plays a significant role in the holistic development of preschool-aged children. The fundamental principle of Montessori education is not to impose learning upon the child, but rather to support and encourage the child's natural interests and intrinsic motivation. Through the Montessori Method, children are guided toward independent learning, while the educator creates appropriate conditions and a well-prepared environment for all educational activities. In this context, learning becomes a self-directed and meaningful process. Overall, Montessori pedagogy not only has a substantial impact on early childhood development, but also contributes to the formation of independent, active, and intellectually curious individuals. An approach based on Montessori principles promotes respect for the child's personality, fosters the development of innate abilities, and ensures thorough preparation for all subsequent stages of education.

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DESIGNING A STRUCTURAL MATRIX OF INNOVATIVE COMPETENCE FOR HIGHER EDUCATION TEACHING STAFF

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Abstract. *The rapid digitalization of higher education, the widespread use of artificial intelligence tools, and the increased focus on sustainability have all redefined the role of teaching staff. In such an environment, innovative competence is more than just creativity or digital competence; it is a complex, multidimensional competence. Previous research has examined different aspects of innovative competence, but existing competence models are usually fragmentary, focusing on individual aspects of innovative competence while failing to provide an integrated structural competence model. This study attempts to fill the gap by proposing a structural analytical matrix of innovative competence for teaching staff in higher education. The research is conceptual in nature, based on the synthesis and comparative analysis of existing competence models. Competence clustering and structural competence modeling are used to define innovative competence as a complex, multidimensional competence consisting of four interrelated competence clusters: innovation and research competence, digital-methodological competence, personal and communicative competence, and adaptability and sustainability competence. The matrix structure combines elements of functional grouping and development logic, thus allowing competence to be viewed as a dynamic, evolving system. The proposed competence model contributes to the theoretical refinement of competence-based education by providing an integrated analytical competence model that encompasses cognitive, technological, behavioral, and adaptive competence. It also has practical implications for the evaluation and development of innovative competence in higher education, providing a comprehensive foundation for the systematic evaluation and development of innovative competence in higher education.*

Keywords: *innovative competence, higher education, matrix, competency, AI technologies.*

Introduction

In recent decades, the idea of innovative competence has gained greater brightness in debates concerning reforms in education and modernization of institutions. The complexity of teaching settings, the development of digital technologies, and the need for sustainable and flexible education have redefined the professional profile of university teachers. The review of scientific publications concerning the components of innovative competence of teaching staff shows that there are different approaches and content. According to some researchers, innovative competence is a set of psychological and creative abilities teachers apply in pedagogical activities. Others interpret it as a collection of technological and methodological skills.

M.S. Taramova, L.X. Djabrailova, and X.N. Magomedova [5] have investigated the innovative competence of teachers, including its nature and structural elements. The following

interrelated and mutually reinforcing core components of innovative competence were identified: the motivational-value component, the creative component, the technological component, and the reflective component.

The motivational-value component includes a teacher's intrinsic motivation for innovation and value-based orientations concerning professional development, creative engagement, and pedagogical renewal. The creative component encompasses the capacity to conceive innovative ideas and execute them in practice. Designing educational projects based on current pedagogical approaches and international best practices; conducting innovations, developments, idea generation, project implementation, and experimental work; identifying tools and strategies for problem-solving, achieving objectives, and forecasting outcomes; and incorporating innovations into the educational process are all included in the technological component, which is also regarded as a critical component of innovative competence. The capacity to examine and assess one's own pedagogical practice is known as the reflective component of an innovative teacher's competency.

Therefore, the four main elements - motivational, creative, technological, and reflective that were put forth by M.S. Taramova, L.X. Djabrailova, and X.N. Magomedova collectively cover a teacher's internal preparedness for innovative activity, ability to come up with new ideas, proficiency with technology in the classroom, and capacity to evaluate their own professional performance critically. By adding more elements, such as moral-ethical, cognitive, operational, and communicative components, G.I. Boichanu [1] broadens the scope of these components of innovative competence. The communicative component focuses on the teacher's capacity for productive interaction, teamwork, and information dissemination, while the moral-ethical component specifically highlights the teacher's dedication to their profession and sense of social responsibility.

L.S. Neradovskaya [2] investigates the terms “innovation,” “innovative activity,” and “innovative competence,” analyzing the structural components of a teacher’s innovative competence as motivational readiness, creative ability, research skills, and reflection. Motivational readiness is evident in the teacher's acknowledgement of innovative activity as a professional asset, whereas creative ability is demonstrated through socially significant initiative and active participation. The teacher's ability to analyse and improve their innovative activity, as well as to test and put its structural parts into practice, shows that they have reflection and research skills. L.V. Shkerina [4] conducts a comprehensive analysis of the concept of "innovative pedagogical competence" among students in higher education institutions focused on pedagogy. The author defines this concept as a set of 3 competencies. They are key competencies, innovative basic competencies, and innovative special competencies.

A.R. Ovbiagbonhia, B. Kolléel, and P. den Brok's [3] research indicates that innovative competence is made up of a number of interrelated core components, such as creativity, leadership, creative self-efficacy, creative drive, risk-taking propensity, and the capacity to solve complex problems. The researchers stress that one essential component of innovative competence is creativity. It is distinguished by the capacity to produce original ideas and create unorthodox yet practical answers to current issues. A key component of innovative activity is leadership, which includes the capacity to pursue well-defined objectives, form professional partnerships, inspire initiatives, exhibit organisational abilities, and inspire other experts to work toward common goals.

Methodology

A multidimensional matrix model of the innovative competence of higher education pedagogical staff was constructed in this study using a conceptual and structural-analytical design.

The study's foundation is a comparative analysis of current competencies and a methodical theoretical generalisation. The primary objective is to integrate the disparate notions of innovative competence into a coherent structural model that captures the development process as well as its internal logic. Finding the key elements, examining how they relate to one another, and organising them into a matrix structure that guarantees ideological coherence and usefulness are all important steps in the analysis process.

Results

As a result of theoretical analyses, we combined all the components into matrix and called "Matrix of innovative competence" for higher education teaching staff. The matrix includes following competencies: innovative thinking, problem solving, decision making, experimental, research, digital pedagogical, methodological, self-development, collaborative, reflective, intercultural and communicative, adaptability and competencies of sustainable development and green skills. The whole matrix is presented in Table 1.

Table 1. Matrix of innovative competence

Competency group	Competencies	Skills
I. Innovative and research competencies	Innovative thinking competency	Generating new ideas, developing innovative approaches, finding creative solutions in complex situations
	Problem-solving and decision making competency	Rapid situation analysis, identifying effective solutions, adaptability while working with students
	Experimental competency	Testing innovative tools, evaluating through practice, introducing changes based on results
	Research competency	Publishing scientific articles, participating in conferences, applying research methods
II. Digital-methodological competencies	Digital pedagogical competency	Using technologies, integration of artificial intelligence, monitoring technological developments
	Competency in applying methodological innovations	Integrating innovative teaching methods, using games and interactive tasks, updating curricula
	Self-development competency	Continuous professional development, self-improvement, enhancing professional performance
III. Personal and communicative competencies	Collaborative competency	Teachwork experience, knowledge sharing, cooperation with students
	Reflective competency	Reflection, learning from mistakes, increasing activity effectiveness
	Intercultural and	Intercultural communication skills,

	communicative competency	teaching practical language, cultural sensitivity
	Adaptability and change readiness competency	Level of adaptability, accepting innovations, managing change
IV.Adaptability and sustainaility competencies	Competency of sustainable development and green skills	Integration of sustainable development principles, environmental literacy, practical ecological initiatives

Discussion

When compared to other frameworks, the suggested matrix of innovative competence has a number of conceptual and structural advantages.

The model first guarantees systemic integration. Although numerous earlier studies have distinguished distinct elements of innovative competence, such as leadership, motivation, creativity, and technological literacy, these elements are frequently presented in linear or fragmented formats. The matrix approach, in contrast, reflects the multifaceted and systemic nature of innovative professional activity by grouping competencies into interconnected clusters. This integrative framework improves theoretical coherence and lessens conceptual overlap.

Second, the model's applicability to the modern transformation of education is strengthened by the addition of sustainability and adaptability dimensions. The suggested framework acknowledges the significance of resilience, change management, and sustainability-oriented thinking in contemporary higher education systems, in contrast to previous models that mainly concentrate on creativity or technological proficiency.

Third, there can be plenty of diagnostic potential in the matrix. The model can be used as a foundation for creating an Innovative Competence Index or institutional assessment tools because competencies are arranged into distinct clusters with observable skills. Its practical applicability in professional development monitoring and teacher evaluation systems is improved by this feature.

Conclusion

In this paper we have suggested a format of the structural-analytical matrix of innovative competence of the teaching staff in higher education. Through a systematic integration of major theories, it has been found that the fragmented focus on particular dimensions such as creativity, motivation, technological competencies and leadership with less concern about how these components should be articulated into an integrative system hinders current conceptualizations of innovative competence. In conclusion, the matrix proposed in this paper provides an inclusive and structured method to understand and evaluate innovative competences among academic staff which can be useful for shaping strategic development of higher education under a background of global change.

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ADVANTAGES OF NON-TRADITIONAL METHODS IN TEACHING "TECHNOLOGY" LESSONS IN GENERAL EDUCATION SCHOOLS

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Abstract. *This article analyzes the key conditions that teachers and students should adhere to in the process of teaching the subject "Technology" in general education schools. Particular attention is paid to the formation of students' perceptions through graphic representations and to the practical production of objects based on these graphical images. The article examines methods for monitoring the correctness of completed objects through sketches, drawings, and technical illustrations, as well as through accurate reading of drawings and comparison with the finished products. These approaches are considered important criteria for determining students' level of acquired knowledge and for ensuring the quality and effectiveness of instruction. The methodological essence, content, and pedagogical practical foundations of the applied teaching methods are revealed. The advantages of non-traditional lesson formats, interdisciplinary connections, and the use of visual teaching aids such as images, drawings, models, and video materials are discussed. Various forms of instructional organization are described, including frontal instruction, individual and independent work, pair work, brainstorming, verbal and visual methods, observation, correct interpretation of drawings, strict adherence to dimensions when producing objects based on drawings, as well as comparison and assessment techniques. In addition, examples from the sayings of great scholars who emphasized the value of labor and promoted a positive attitude toward work are presented.*

Keywords: *non-traditional teaching methods, verbal methods, practical methods, frontal instruction, individual and independent work, pair work, visual representations, drawings, sketches, reading graphical images, assessment, comparison, analytical evaluation, aesthetic sense.*

Introduction

In general education schools, the primary task of teaching "Technology" lessons is the proper organization of the learning process by the teacher and the provision of correct education and upbringing to students. In this regard, the adoption of the Law on Education, the National Program for Personnel Training, state educational standards, as well as the availability of curricula, textbooks, and instructional and methodological manuals constitute one of the most important issues of national significance.

At present, in contrast to previous periods, non-traditional teaching methods enriched with modern pedagogical technologies are widely applied in technology lessons taught in schools. The use of such contemporary methods by teachers in the classroom ensures higher effectiveness and efficiency in providing education and upbringing to students, contributes to the development of their practical skills, and enhances their interest in the subject.

Forms of Instruction Known in Education

1. Frontal, Individual, and Independent (Individualized) Work

In the effective organization of technology lessons, the forms of instruction such as frontal, individual, and independent (individualized) work play a significant role. These forms are applied depending on students' level of knowledge, abilities, and the content of the lesson, and they complement each other in the teaching process.

In the frontal form of instruction, the teacher works simultaneously with all students. This method is mainly used when introducing new topics, explaining safety rules, and demonstrating practical tasks. Through frontal instruction, students are provided with a general understanding of the subject matter, and the rules for reading drawings, sketches, and graphical representations are explained. This form is particularly effective at the organizational and explanatory stages of the lesson.

In the individual form of work, each student performs the assigned task according to their own abilities and working pace. In technology lessons, this form is widely used in activities such as manufacturing objects, working based on drawings, and creating sketches. Individual work develops students' independent thinking, responsibility, and creative approach. At the same time, the teacher observes each student's work and provides individual support when necessary.

Independent (individualized) work represents a more in-depth form of individual instruction and involves assigning specific tasks based on the student's level of knowledge and abilities. This form is often applied when working with students who experience difficulties or, conversely, with gifted students. Through independent work, students' shortcomings are eliminated, or their abilities are further developed.

In conclusion, the appropriate and purposeful application of frontal, individual, and independent forms of work in technology lessons enhances the quality of education and plays an important role in the formation of students' practical skills.

Individual (Independent) Work

In technology lessons, the form of individual, that is, independent work serves to organize the educational process by taking into account students' personal abilities, level of knowledge, and interests. This form directs students toward independent activity and provides opportunities for the gradual development of their practical skills.

During individual work, each student is assigned a specific task, or conditions are created for completing a general task in accordance with their own working pace and capabilities. In the subject of Technology, this form is mainly implemented through practical activities such as creating drawings and sketches, reading graphical representations, and producing objects based on specified dimensions. As a result, students develop a sense of personal responsibility for their own work.

The independent work format fosters students' skills in independent thinking, making correct decisions in problem situations, planning the work process, and exercising self-control. In this process, the teacher acts as a consultant and guide, providing individual support when necessary and explaining mistakes and shortcomings in a timely manner.

Furthermore, individual work in technology lessons creates broad opportunities for students to demonstrate their creative abilities. Each student approaches the production of objects based on their own aesthetic sense and imagination. This not only increases students' interest in the subject but also consciously guides them toward future career and vocational choices.

When organizing lessons using these approaches, it is advisable for technology teachers to apply the following non-traditional teaching methods:

- brainstorming;
- verbal methods;
- visual demonstration;
- frontal instruction;
- work in small groups;
- pair work and observation;
- comparison and analytical analysis;
- viewing video materials;
- project-based learning;
- creating sketches;
- correct reading and execution of drawings, sketches, and graphical images;
- producing required objects and items based on drawings and sketches;
- observation, analysis, and accurate assessment of completed products;
- self-assessment and peer assessment of completed work based on drawings and sketches;
- submission of completed work;
- maintaining workplaces and tools in a clean and orderly condition.

A technology teacher who appropriately and effectively applies the above-mentioned methods can achieve significant success in education and upbringing, creating broad opportunities to enhance the quality and effectiveness of instruction.

- Knowledge and tasks presented by the teacher through verbal explanations and visual demonstrations are quickly and consciously understood by students.

- Students learn to read and correctly interpret graphical representations with ease and accuracy.

- Through frontal, small-group, and pair-based tasks, students learn to complete assignments accurately and without waste, based on graphical images, drawings, and sketches.

- Students learn to observe and evaluate the work performed by their peers.

- They acquire the ability to independently analyze and assess the extent to which completed objects and items correspond to the drawings.

- Students master the sequence of project-based activities.

- They learn to independently read and correctly execute drawings and sketches.

- Assessment skills are developed.

- During practical work, students learn to identify mistakes, shortcomings, and achievements and to correct them in a timely manner.

- Students develop carefulness, thriftiness, full compliance with safety regulations, cleanliness, orderliness, and an aesthetic sense.

- All of these factors contribute to increasing students' interest in the subject and fostering a positive attitude toward labor and diligence. The essence of human dignity, according to the great thinker **Sa'di**, lies in relying on knowledge and craftsmanship and not being dependent on others. In this regard, he offers the following moral lesson:

- *A person who earns bread through his own labor Is free from the burden of others' favors.*

Nizami Ganjavi is regarded as one of the greatest representatives of Eastern literature and spiritual thought. In his works, he presents the invaluable role of knowledge, craftsmanship, and labor in human life in a profound philosophical manner. The thinker emphasizes that human perfection is achieved not merely through lineage or wealth, but primarily through knowledge and

professional skills. According to his views, a person who acquires a craft finds their rightful place in society, leads an independent life, and contributes positively to others.

Nizami Ganjavi considers craftsmanship a force that elevates human dignity and promotes both spiritual and material development. Therefore, he encourages young people to pursue knowledge, engage in labor, and master a profession. His following wise verses clearly illustrate this idea:

- *Learn a craft - within it lie many secrets; It opens locked doors one by one.*

- These ideas have not lost their relevance even today and are particularly consistent with the content and essence of the subject "Technology" taught in general education schools. Through technology lessons, fostering students' interest in learning a craft and educating them in the spirit of diligence is fully aligned with the principles advanced by Nizami Ganjavi.

- Khoja Bahauddin Naqshband is one of the prominent figures of Sufi teaching, who placed special emphasis on the role of honest labor, professional skills, and spiritual purity in human development. In his doctrine, labor is viewed not merely as a means of satisfying material needs, but as a crucial factor that educates the individual and leads them toward moral perfection. Therefore, Naqshbandi teachings stress the harmonious combination of worldly labor and spiritual purity as an essential principle of human life.

- The well-known maxim put forward by the scholar - *"Dil ba yor, dast ba kor"*, meaning *"Let your heart be with God, and let your hands always be engaged in labor,"* encourages the younger generation to practice honest work and to acquire responsible and socially useful professions. These views are closely connected with the aims and objectives of the subject "Technology" taught in general education schools.

- Through technology lessons, the formation of such qualities as diligence, patience, discipline, and thriftiness among students is fully consistent with the ideas advanced by Khoja Bahauddin Naqshband. During practical activities, students comprehend the true value and dignity of labor by creating objects with their own hands, which has a positive impact not only on their professional development but also on their moral and spiritual growth.

Conclusion

In conclusion, teaching the subject "Technology" in general education schools based on non-traditional instructional methods is one of the most pressing issues arising from contemporary educational requirements. Through this subject, students develop not only practical knowledge and skills but also important personal qualities such as diligence, independence, responsibility, thriftiness, and aesthetic awareness.

The non-traditional methods discussed in the article - such as frontal, individual, and independent work, activities in small groups and pairs, brainstorming, project-based learning, and the production of objects based on graphic representations - contribute significantly to increasing the effectiveness of technology lessons. These approaches foster students' independent thinking and transform them into active participants in the learning process.

Moreover, working with drawings, sketches, and technical illustrations in technology lessons expands students' imagination and develops their skills in planning and analyzing practical activities. The use of self-assessment and peer-assessment methods in the evaluation process promotes critical thinking and cultivates a culture of fair and objective assessment among students.

The views of great scholars - Sa'di, Nizami Ganjavi, and Khoja Bahauddin Naqshband - on labor and craftsmanship further strengthen the educational and moral essence of the subject

"Technology." Their ideas encourage the younger generation to engage in honest work, acquire professional skills, and find their rightful place in society.

Overall, organizing technology lessons based on modern pedagogical approaches creates a solid foundation for students' comprehensive development, their conscious preparation for future career choices, and their formation as mature, morally sound individuals who can contribute meaningfully to society.

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PEDAGOGICAL THEORIES ON THE EDUCATION OF CHILDREN IN NEED OF SPECIAL ASSISTANCE AND THEIR ROLE IN INCLUSIVE EDUCATION

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Abstract. *Analysis of pedagogical theories on children's education for special assistance pedagogical technologies, content, problems of inclusive education are analyzed. Special assistance is given the relevance of understanding the problems of the modern practice of training defectologists for working with children with children and developing ways to eliminate them, taking into account the comprehensive scientific assessment and modern requirements of the state and society.*

Keywords: *inclusive education, pedagogical, psychological, adaptation, equality in education, human rights, universal values.*

Introduction

The state policy of the Republic of Uzbekistan in the field of education relies on the principles of the priority of universal values, human rights, the humanistic nature of education, the guarantee of everyone's constitutional rights to knowledge, the use of equal rights from education. The priority areas for the development of education are the following: guaranty of the rights, freedoms and legitimate interests of citizens in the field of Education; equality in education, including the creation of conditions for persons with special psychophysical characteristics in their development, in accordance with their health and cognitive abilities, at all levels of basic education and further education; creating special conditions for obtaining special education for persons with special psychophysical characteristics in their development and providing them with corrective pedagogical support; to create the necessary conditions for meeting the needs of society and the state in the formation of the individual's educational needs, as well as in the formation of personality, in the training of qualified personnel.

Priority areas of public policy in the field of education; quality, accessibility, personality orientation, content, variety of educational programs and directions of education, etc. The priority policy of our state is to bring up the younger generation as a mentally fit, physically healthy, spiritually mature, comprehensively developed perfect person. Analyzing the works of our great thinkers, we are witness to the fact that with their works they created a rich methodological basis of the content of educational education of children with disabilities. All of our great thinkers, such as Abu Nasr Farabi, Ibn Sina, Alisher Navoi, viewed society as a whole and considered all human beings equal. Therefore, the education of children with special needs as an equal member of society has not been left out of the spotlight even by Great Eastern thinkers as early as the 11th and 12th centuries, just like in modern times.

Education in secondary schools was included in the public policy plan in order to develop compensatory opportunities in the education of children in need of special assistance in many states, as well as to ensure adequate social adaptation. This resulted in a universal conference in

Thailand in 1990. The conference adopted a universal" education for all " Decloration. The concept of "inclusive education" from English, inclusive, inclusion means to harmonize, harmonize, encompass, cover. P.f.n, Associate Professor R.Shomahmudova described as"an educational system that represents the elimination of barriers between disabled and special-needs learners, the active participation of the family, in particular the satisfaction of the child's need and the adaptation to social life and the complete addition to the general education system, regardless of defects or economic difficulties in the development of children and adolescents with special education.

Since inclusive education is aimed precisely at the problem of training, education, vocational training of young people with limited physical capabilities, we have more focused on the scientific research work carried out in the field of special pedagogy in the countries of our Republic and the Commonwealth.

Theories on Inclusive Education in our republic Mature in the field of special pedagogy L.R.Mo'minava the theoretical foundations of correctional and pedagogical work on the elimination of speech impairment of children with disabilities of preschool age have been developed by minova, and a method of logopedic examination and training of children has been created and put into practice. Within the framework of the scientific research of L. SH.Nurmuhammedova "pedagogical features of raising a disabled child in a family", the specifics, difficulties and the need for socio-pedagogical, psychological guidance of parents with a disabled child in the family were analyzed and a number of scientific results were obtained. The complete or partial loss of the ability of a person in need of special assistance to provide self-service, independent movement, to obtain moderation, to be treated, to control his own behavior, to study or engage in labor activity, indicates the need to implement measures for its social protection.

It depends on the realization that a person is responsible for himself, for the phenomena that occur in his imagination, on the personal characteristics that are formed during the period of his disability.SH.M. Amirsaidova's research studied the scientific opinions of Eastern thinkers on special pedagogical science, analyzed the medical-scientific, pedagogical and psychological ideas of Abu Ali Ibn Sina, which serve for the prosperity of special pedagogical science, and developed methods of introduction to the educational process. M.P. Hamidova In the research work by Hamidova entitled "corrective-pedagogical foundations of improving vocabulary of Mentally Retarded Children of preschool age", methods for examining speech of mentally retarded children were created based on general and special pedagogical studies. As a result of the examination of children, the criteria for the underdevelopment of speech of mentally retarded children have been developed. The content and methods of Correctional–pedagogical work have been developed, aimed at expanding the perception of mentally retarded children of preschool age about objects, increasing interest in knowledge and speech motivation, while involving their emotional–volitional sphere.

D.A. Nazarova's scientific work aimed at the development of speech of weak hearing children in preschool age, an adapted variant of the methodology for researching the level of speech development of weak hearing children in preschool education, the content, new interactive methods and forms of speech development of weak hearing children in preschool age, a comprehensive system of M.F.Hakimova's research "pedagogical foundations for vocational training of students in need of special assistance" (on the example of mentally retarded students), the following scientific results were obtained:

1. The vocational training of mentally retarded students in special schools, boarding schools and specialized industrial vocational colleges is scientifically-theoretically justified.

2. Factors that influence the occurrence and development of interest in the choice of profession of mentally retarded students in need of special assistance have been identified.

3. Taking into account the psychological and pedagogical features in the preparation of students for the profession, a methodological provision for vocational training has been created. Methodological recommendations, lesson developments and teaching aids have been created for specialized professional colleges.

4. Folk crafts were effectively used in the preparation of students in need of special assistance for the profession.

5. New specialties such as "Chef-Confectioner" and "Wide-Range Clothing Tailor" have been included in the curriculum.

Pedagogical recommendations have been developed for vocational training of mentally retarded students for vocational training teachers in special educational institutions, ensuring the continuity of education, and an effective system of vocational training for students in need of special assistance has been created.

The following scientific innovations were achieved in Mirzayeva's dissertation work on the topic “Ensuring social adaptation of students with limited physical capabilities and improving the methodology for training them in the profession.”

-didactic opportunities of inclusive education aimed at the problems of Social, Psychological and professional adaptation of students with physical disabilities are identified, consisting of interactive communication, cooperation, design and evaluation.

-the model of vocational training of students with physical disabilities is improved based on the optimization of educational criteria and processes aimed at ensuring social adaptation by ensuring the integration of special subjects, as well as analysis of the results of training;

- the information and methodological support of the educational module "Social Adaptation" was developed based on the general didactic principles of the educational content of vocational training for students with disabilities;

-The methodology for developing the motivational, reflexive and communicative skills of students with disabilities has been improved based on an integrative-modular approach to special subjects and ensuring continuity between educational modules.

U.Y.Fayzieva developed a methodology for literate training and teaching weak hearing students in grades 0-1, for the first time examining the general development process, timing and causes of hearing impairment in the period of weak hearing children from the lunar period of the mother fetus to preschool. During literacy training, research was carried out on the formation of vowel pronunciation consonants in children, the formation and enrichment of vocabulary, the determination of the level of understanding of phonemic processes, and for the first time in Uzbek, a system for preparing weak hearing children for literacy and teaching them baskets was developed.

The UK teaching manual, published by Save the children (2002), uses the concepts of inclusive and integrative in the same sense. However, there is a difference between these concepts, which can be expressed as follows:

integratsion education: participation of children with special needs in secondary schools; inclusive education: the quality education of children with special needs. The discrepancy between these two concepts is more understandable, which is emphasized as follows: In integrated education, the child is seen as a problem.

A child in need of special care must adapt to school or society in an individual or medical condition. For example, a child with hearing impairment must learn to speak using the hearing apparatus to adapt to general education conditions. A healthy child, on the other hand, is not required to learn sign language and other forms of communication. In case of learning problems, the child must fulfill the standard requirements. Otherwise, the teacher should undergo additional training. Inclusive education requires changing the system, not the child. In the process of analyzing the theoretical literature, it has become clear that there is also a commonality between the concepts of integrative and inclusivity, at the heart of this commonality lies in the inclusion of children with special needs in the conditions of the general education system. Studying the introduction of an inclusive education system in foreign countries, it was found that the implementation of this educational system takes a long time and a huge amount of material funds is needed. That is why in front of the system of inclusive education in the world community there are so many problems and obstacles as follows available:

- lack of tutorials for parents;
- not recorded in state regulatory documents on the introduction of inclusive education in many states;
- negative attitude towards children with disabilities;
- the problem of non-visibility in the community of children with special needs; the problem of invisibility in school for children with special needs;
- material funds problems; physical adaptation of educational institutions;
- high number of students in the classroom; poverty;
- discrimination based on sexual differences;
- dependence of children with special needs on others; emergency situations conflicts refugees;
- human resources problems.

The right question arises, Why should children with special needs be involved in an inclusive education system? What is the need to solve the above problems and switch to an inclusive education system? Indeed, solving the problems before this educational system is not easy. But there is a lot of nafli aspect of this educational system, among which are the following:

inclusive education allows you to get rid of the stigma of poverty and separation; inclusive education allows a child with special needs to be in the company of his family and society; inclusive education improves the quality of education for all; prevents discrimination;

Education education for children with special needs in the conditions of general educational institutions does not bring only effective results. To do this, it is necessary to create an atmosphere of friendly relations at the school by educators, defectologists, psychologists. The formation of an atmosphere of friendliness in the classroom sets the stage for healthy and special-needs children to be affectionate towards each other, constantly helping each other. Increases the self-confidence of children with disabilities. This ensures that the correctional-pedagogical work is carried out efficiently and more easily. Inclusive education requires the creation of additional facilities for children with limited access to education in general educational institutions and, in this way, favorable conditions for children with disabilities.

To effectively carry out work aimed at the implementation of inclusive education of children with disabilities, their adaptation to social life, employees of a special field and parents of children with disabilities are also included in responsible works to explain the importance of inclusive education, the need for social. Zero special needs children's basic problems cannot be

solved by providing education away from their environment and family. Achieving social integration is a difficult task when members of a society with limited opportunities do not have equal rights and opportunities as members of a healthy society. Solving the problem of equality in the education of children with special needs is one of the pressing problems of today. But even today, a huge number of children are left out of education for various reasons. It is necessary to consider organizational, scientific and methodological issues of involvement in inclusive education, develop measures for training and professional development of specialists. There are two main factors in attracting children who need special assistance to general educational institutions. First, children with disabilities can also interact together with their healthy peers. When Inclusive Education is organized in a purposeful way, children with special needs are protected from the social side, while healthy children are raised on the principles of social justice and equality, are more affectionate and attentive to children with disabilities, are relatively more sensitive, they consider it natural to take care of them.

Secondly, children with disabilities also feel that they have the right to study, educate side by side with healthy peers, and begin to adapt to social life more easily and earlier. Inclusive education requires cooperation between parents, educators, specialists, and the community in the education and upbringing of children with disabilities. Pedagogical, organizational, and methodological work is necessary to implement inclusive education in a unique way. The education of children with special needs in general education is organized taking into account their specific characteristics, type of defect, level and number of children in the class. First of all, it is worth noting that although the young people of the students are the same, but they are not like each other. The individual psychological, personal characteristics, level of perception, mind and abilities of all children are different. Therefore, the issue of organizing the educational process in inclusive classes, where a child with special needs is being educated, requires solving more complex problems. In an inclusive class, it is possible to achieve a successful course of the lesson process if the teacher takes note of the possibility of children and can plan the lessons accordingly, use effective ways to influence their knowledge and overcome difficulties, fully establish school and family cooperation, confidently look at the future of a disabled child. Each child develops to the best of his or her abilities. The famous psychologist L.S.As vigotsky said:”progress will continue even in any mental or physical defect."Tadqiqot metodologiyasi (Research methodology).

The historical development of society, allowing new views on the possibilities of individuals, the development of inclusive education was strengthened in the legal documents that determine the right of each member to education in the social community. Under the UN Convention on the rights of persons with disabilities, any differentiation in disability, equal recognition of its purpose or outcome, is the restriction of human rights and fundamental freedoms in spiritual, political, economic, social, cultural, civil and any other sphere. The principles of the convention define

a) respect for a person's values, respect for his freedom of choice and independence;
b) full inclusion in society;
v) non-discrimination;
g) respect for the characteristics of people with disabilities;
d) equality of opportunity;
e) gender equality;
f) respect for children with disabilities;

g) guarantee the right to education for people with disabilities. States participating in the convention are obligated to exercise these rights, whereby

(a) children with disabilities are not excluded from the free general secondary education system;

(b) children with disabilities will be able to receive inclusive free primary and secondary education on an equal footing with others;

(c) quality education and upbringing are guaranteed;

(g) children with disabilities will receive the necessary;

d) effective measures will be taken to organize individual education in the most favorable conditions for Social Development [Article 10].

The basis of the humanistic approach is the principles of self-awareness, cognition, and the doctrine of the zone of proximal development. The humanistic perspective of a teacher is the teacher's trust in the child, accepting each child as their own child and becoming an important participant in their life.

Conclusion

The main strategic direction is the successful solution of their social problems, which are determined by pedagogical conditions. This direction is an important factor that determines the development of inclusive education. As a means of achieving the goal, the main goal of mastering values and them in the educational process, and teaching and raising in the paradigm of a humanitarian approach is the personal development of each child, his abilities and self-awareness. The humanitarian approach generally implements the idea of socialization social development as a goal and result of the educational and educational process for children in preschool and primary education. Socialization is seen as a guided tamaddun, which carries out the Re-production of the value system by increasing the individual's awareness of involvement in socio-cultural activities. The social adaptation of children in need of special assistance is seen as the basis for their inclusion in the social space. Real socialization can be carried out in the context of interaction. It is this type of interaction that is the mechanism of the formation of the social experience of the individual, and secondly, it is the form of the development of relations of the social community.

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DEVELOPMENT OF COMMUNICATION SKILLS IN PRESCHOOL CHILDREN AS A PRIORITY DIRECTION OF MODERN PRESCHOOL EDUCATION

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Abstract. *In the context of modernizing the preschool education system, the issue of developing communicative skills in preschool children is becoming particularly relevant. Contemporary requirements for the educational process are focused not only on the acquisition of knowledge but also on fostering children's ability to interact effectively with others, express their thoughts, feelings, and needs, and understand other participants in communication. Communicative development is regarded as a priority area that ensures successful socialization of the child and readiness for school education. The article reveals the essence of communicative skills in preschool children, their structure, and the specific features of their formation at different age stages. The significance of communication as a leading factor in a child's psychological and personal development is substantiated. Special attention is paid to the role of the teacher in creating a developmental communicative environment that promotes active verbal and social interaction among children. Effective pedagogical methods and forms of work aimed at developing communicative skills are considered, including role-playing games, dialogic exercises, collective creative tasks, dramatized activities, and communicative play situations. The necessity of integrating communicative development into all types of children's activities play, cognitive, labor, and artistic-aesthetic—is emphasized. It is noted that purposeful and systematic work on the formation of communicative skills contributes to the development of speech activity, emotional responsiveness, cooperation skills, and the ability to resolve conflict situations. The article concludes that the development of communicative skills is a crucial condition for improving the quality of preschool education and ensuring the successful personal development of the child in modern society.*

Keywords: *preschool education, communicative development, communicative skills, socialization, play activity, educational environment.*

Introduction

It is important to suggest that the modern preschool education system is oriented toward the comprehensive development of a child's personality, including the formation of communication skills as a foundation for successful socialization. The communicative development of preschool children primarily occurs through collaborative activities. In this age period, play is the leading type of activity, possessing significant developmental and educational potential. Through play, children develop speech abilities, cooperation skills, emotional responsiveness, and social norms of behavior.

Despite the substantial number of studies devoted to the problem of communicative development in preschoolers, there remains a need to identify and justify effective pedagogical conditions for using play activities in the educational process of preschool institutions. Play

activities serve as an effective pedagogical tool for developing communication skills in preschool children. Purposeful and systematic use of play forms within the educational process contributes to an increased level of communicative development and successful socialization.

Theoretical and Methodological Foundations for Studying Communication Skills in Preschoolers. The problem of communication and the communicative development of personality occupy an important place in the works of both domestic and foreign researchers. Within the framework of L. S. Vygotsky's cultural-historical theory, communication is considered a key condition for a child's psychological development and a source for the formation of higher mental functions. A child acquires social experience through interaction with adults and peers, which shapes both personal and cognitive development. From the perspective of the activity-based approach developed by A. N. Leontiev, communicative skills are formed through collaborative activity, in which communication acts either as a distinct type of activity or as a component of other activities. In preschool age, play is the leading activity, within which optimal conditions for developing communication are created. D. B. Elkonin emphasized that in role-playing and story-based games, children learn social roles and norms of interaction, coordinate their actions with others, and develop communication skills. Thus, the communicative skills of preschoolers form in inseparable connection with their activities and social environment.

Essence and Structure of Communication Skills in Preschool Children

In pedagogical and psychological literature, communication skills are considered a set of abilities that ensure effective interaction between an individual and their environment. The structure of preschoolers' communicative skills typically includes several interconnected components:

- Speech component: the ability to use language as a means of communication, formulate statements, ask questions, and maintain dialogue.
- Emotional-personal component: the ability to express and recognize emotions, show empathy, and consider the emotional state of the communication partner.
- Behavioral component: adherence to norms and rules of communication, the ability to negotiate, resolve conflicts, and cooperate with peers.

The formation of these components occurs gradually and depends on the age and individual characteristics of children. Preschool age is a sensitive period for developing communication skills, which necessitates creating specific pedagogical conditions within the educational process.

The educational environment of a preschool institution is a crucial factor in forming children's communication skills. The educational environment is understood as the combination of conditions that ensure a child's personal development, including spatial and material organization, the nature of interaction among participants, and the content of educational activities. A communication-rich environment provides opportunities for free interaction, collaborative activities, and role-based interaction. The teacher's role is vital: they act not only as a source of knowledge but also as an organizer of communication, a partner, and a mediator in children's interactions. Establishing a favorable psychological climate based on respect, support, and acceptance fosters children's self-confidence and readiness to communicate. In such conditions, children engage more actively in interaction, show initiative, and internalize social norms of behavior.

Play as the Primary Means of Developing Communication Skills

Play is the leading type of activity in preschool age and has significant potential for developing communication skills. Through play, the child becomes integrated into a system of

social relationships, learns roles and rules, and develops the ability to consider the perspectives of others. Role-playing games promote the development of dialogical speech, the ability to negotiate rules, assign roles, and coordinate joint actions. Didactic games focus on developing speech and cognitive skills, while active/movement games foster the formation of interaction skills within a group. Pedagogical guidance of play activities should be unobtrusive and aimed at supporting children's initiative. It is important to create conditions in which play becomes a space for free communication and collaboration.

The Role of the Teacher in Developing Communication Skills in Preschoolers

The effectiveness of developing communication skills largely depends on the teacher's professional position. The educator acts as the organizer of the educational environment, a model of communicative culture, and a mediator in children's interactions. Pedagogical support for communicative development involves using a variety of work forms, creating situations for interaction, supporting children's initiatives, and fostering positive experiences of communication. A child-centered approach that takes into account each child's individual characteristics is of particular importance.

Conclusion. Thus, the development of communication skills in preschool children is one of the priority areas of modern preschool education. Communicative development ensures the child's successful socialization, formation of personal qualities, and readiness for further learning.

Play activities, the educational environment, and the teacher's professional role are key factors in shaping communication skills. A systematic and purposeful approach to organizing the educational process creates conditions for full-fledged communication and interaction among preschool children. The prospects for further theoretical research are associated with an in-depth analysis of contemporary challenges in the communicative development of preschoolers and the search for effective pedagogical strategies to address them.

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STEAM EDUCATIONAL TECHNOLOGY AND NATURAL SCIENCES IN PRIMARY EDUCATION: AN IMRAD-BASED ANALYSIS OF PROJECT DESIGN, MODELING, AND COMPETENCE FORMATION

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Abstract. *The modernization of primary education in Uzbekistan requires teaching approaches that connect knowledge with practice, develop natural and scientific literacy, and prepare pupils to solve real-life problems through integrated learning. This article analyzes the pedagogical value of STEAM educational technology in the teaching of natural sciences at the primary level. The study is based on a qualitative documentary and conceptual analysis of national educational policy priorities, methodological literature on educational design, and the pedagogical principles of project-based STEAM instruction. The article reorganizes the theoretical material into an IMRAD structure and proposes a practical model for introducing small-scale STEAM projects into primary natural science lessons. The findings show that STEAM technology is not limited to the use of modern equipment or digital resources. Rather, it functions as an integrated pedagogical system in which science, technology, engineering, art, and mathematics are combined through purposeful project design, modeling, experimentation, presentation, and reflection. The results also indicate that educational projects may be individual, pair-based, or group-based; short-term, medium-term, or long-term; and research-oriented, creative, informational, theoretical, or practice-oriented. For primary learners, the most effective STEAM projects are small, clearly structured, visually supported, and connected with observable natural phenomena. The article concludes that STEAM technology can improve pupils' scientific literacy, creative thinking, collaboration, and practical problem-solving skills when teachers plan the learning process through clear goals, expected outcomes, resources, assessment criteria, and feedback mechanisms.*

Keywords: *STEAM education; natural sciences; primary education; project-based learning; educational design; modeling; competence-based approach; scientific literacy.*

1. Introduction

The development of modern education is increasingly connected with the ability of schools to prepare learners for a society in which knowledge is interdisciplinary, technology is rapidly changing, and practical problem solving is becoming a central educational demand. In this context, the modernization of the educational stages in Uzbekistan is being organized on the basis of innovative approaches. Primary education is a particularly important stage because it forms the first systematic foundation for pupils' cognitive activity, scientific curiosity, communication, cooperation, and independent thinking. If learners acquire only fragmented subject knowledge at this stage, they may find it difficult to transfer their knowledge to new situations. Therefore, primary education needs teaching technologies that connect concepts, activities, values, and real-life experience.

STEAM educational technology is one of the approaches that responds to this need. The acronym STEAM refers to the integration of science, technology, engineering, art, and mathematics. In the teaching of natural sciences, this approach is valuable because it allows learners to observe a natural phenomenon, ask a question, design a simple solution, construct or model an object, test the result, present evidence, and improve their work. In other words, STEAM changes the lesson from the passive reception of information into a structured process of inquiry and creation. This is especially relevant for primary school students, whose thinking is strongly connected with concrete objects, visual materials, movement, play, and direct experience.

The educational policy framework of Uzbekistan also creates a basis for the wider introduction of STEAM technology. The Decree of the President of the Republic of Uzbekistan No. PF-5712 dated April 29, 2019, on the Concept for the Development of the Public Education System until 2030 emphasizes the development of STEAM disciplines, critical thinking competencies, and the ability to independently process and analyze information. The same strategic direction is reflected in the demand to implement general education programs and new state educational standards that meet the requirements of a modern innovative economy. In addition, the Resolution of the President No. PQ-4623 dated February 27, 2020, on the further development of pedagogical education highlights the need to improve general secondary education on the basis of national pedagogical experience and international educational programs.

These policy priorities are closely connected with international assessment programs such as PIRLS, PISA, TIMSS, EGMA, and EGRA. Although these programs differ in their direct objects of assessment, they all emphasize meaningful understanding, the application of knowledge, reading and interpreting information, reasoning, and problem solving. Consequently, the introduction of STEAM educational technology into primary natural science teaching is not a decorative innovation. It is a methodological requirement arising from the need to strengthen pupils' ability to use knowledge in practical and interdisciplinary situations.

The problem addressed in this article is that STEAM is often discussed as a general slogan, while teachers need a clear pedagogical explanation of how project design, modeling, and competence formation can be organized in natural science lessons. Primary teachers also need to understand what an educational project is, how project activities may be classified, what stages are necessary for preparing a lesson, and how the teacher can balance creativity with structure. The purpose of this article is therefore to analyze STEAM educational technology in relation to natural sciences and to present an IMRAD-based academic explanation of its methodological foundations, implementation stages, and expected educational results.

2. Literature Review

The literature on primary education, pedagogy, and educational technology shows that modern lessons should be based not only on the transmission of ready-made knowledge but also on the organization of meaningful learner activity. In this respect, STEAM technology is related to several wider pedagogical concepts: competence-based education, project-based learning, educational design, modeling, and interdisciplinary integration. Each of these concepts contributes to the methodological basis of STEAM instruction in natural sciences.

A competence-based approach requires that learning outcomes be expressed not only as knowledge of facts but also as the ability to apply knowledge, communicate ideas, collaborate with others, and evaluate results. In primary natural science, this means that pupils should not only memorize the names of plants, animals, weather phenomena, materials, or environmental processes. They should also learn to observe, compare, classify, predict, design, test, and explain.

STEAM technology supports this shift because it makes the pupil an active participant in the lesson and encourages the practical use of knowledge.

Project-based learning is one of the core methodological foundations of STEAM. A project may be understood as a purposeful effort directed toward the creation of a product, model, solution, program, technological map, or other planned result. It begins with an idea and develops through goal setting, planning, resource selection, activity, assessment, and reflection. In pedagogical practice, a project is not only the final product but also the process through which learners experience inquiry, cooperation, responsibility, and presentation. This is why project work is now used not only in industrial companies and technical organizations but also in medical, social, and educational institutions.

The concept of design is also central. Design is a practical activity aimed at creating the content, structure, and expected result of a process or object on the basis of initial data. In education, design includes the teacher's planning of learning goals, tasks, resources, methods, stages, assessment criteria, and feedback. The design process can be described through the sequence "idea - goal - expected result - estimation - prediction - planning." In STEAM lessons, this sequence becomes visible because pupils move from a problem or question to a plan, from a plan to a model, and from a model to a tested and presented result.

Modeling is another important component. A model is a simplified, enlarged, reduced, or similar copy of a real object, system, process, or phenomenon. Modeling allows pupils to understand a complex reality through a manageable representation. In primary education, models may include drawings, diagrams, physical constructions, imitation games, digital simulations, simple mechanisms, or visual organizers. The literature distinguishes several model types used in learning: educational models, experimental models, scientific and technical models, game models, and imitation models. All of these may be adapted to primary natural science if they are age-appropriate and connected with lesson objectives.

Interdisciplinary integration gives STEAM its distinctive identity. A natural science topic can be enriched through technological tools, simple engineering construction, artistic representation, and mathematical measurement. For example, a lesson on plants may include observation of plant growth, measurement of stem height, drawing of the plant structure, creation of a simple watering model, and presentation of the results in a group. Such integration makes the lesson more meaningful because learners see how different forms of knowledge work together in one task.

3. Materials and Methods

This article uses a qualitative documentary and conceptual analysis design. The material for the analysis consists of national policy priorities related to the modernization of education in Uzbekistan, methodological explanations of project design and modeling, and pedagogical classifications of educational projects. The article does not present experimental classroom data; instead, it develops a structured academic interpretation of STEAM educational technology and its application to primary natural science teaching. This design is appropriate because the main objective is to clarify concepts, systematize methodological stages, and propose a practical framework for lesson implementation.

The analysis was carried out in three stages. First, the normative and methodological basis of STEAM education was identified. This included the importance of the Concept for the Development of the Public Education System until 2030, the need for new state educational standards, and the connection between national education reform and international assessment

expectations. Second, key pedagogical concepts were analyzed: project, design, educational process design, technological map, model, and modeling. Third, the concepts were synthesized into a STEAM project-design model suitable for primary natural science lessons.

The methodological logic of the analysis is based on the relationship between educational goal, activity, resource, product, and assessment. A STEAM project is considered effective when it has a clear problem situation, an interdisciplinary task, a planned product, a feasible set of resources, a collaborative process, and criteria for evaluating the outcome. The teacher's role is therefore not limited to explaining the topic. The teacher designs the learning environment, supports pupils during the activity, provides instructions, monitors cooperation, encourages reflection, and evaluates both the product and the process.

The proposed framework is intended for primary-age learners. For this reason, the article emphasizes small projects rather than large and complex projects. Primary pupils need short instructions, visible materials, concrete tasks, and opportunities to manipulate objects. Their projects should be achievable within a lesson, a small sequence of lessons, or a short independent activity. The framework also assumes that learners may work individually, in pairs, or in small groups depending on the content, available resources, and educational purpose.

4. Results

The analysis shows that STEAM educational technology can be implemented in primary natural science through a project-design structure that combines planning, inquiry, modeling, creation, presentation, and reflection. The result is not only a product such as a model, poster, drawing, device, booklet, or presentation, but also a learning process that develops scientific literacy and general competencies. In this structure, each stage has a specific pedagogical function.

A second result is the classification of educational projects according to several criteria. Projects may differ by the number of learners involved, the dominant method of search activity, the nature of the problem, the academic scope, and the duration. This classification helps teachers choose a project format that corresponds to lesson time, pupil age, learning outcomes, and the complexity of the topic. For example, an individual project may support independent inquiry, while a group project may develop cooperation and communication. A research project may develop observation and evidence-based explanation, while a creative project may develop imagination and original representation.

Table 1. Classification of STEAM educational projects for primary natural science lessons

Classification criterion	**Project types**	**Pedagogical value in primary natural science**
Number of participants	Individual, pair-based, and group projects	Allows differentiation, supports self-expression, and develops cooperation in solving practical tasks.
Dominant search method	Research, creative, and informational projects	Develops observation, evidence collection, imagination, source use, and explanation of natural phenomena.
Nature of the problem	Theoretical and practice-oriented projects	Connects concept understanding with practical

		classroom or community-based solutions.
Academic scope	Thematic, interdisciplinary, and extra-thematic projects	Shows the relationship between science, technology, engineering, art, and mathematics.
Duration	Short-term, medium-term, and long-term projects	Helps teachers adapt project work to a single lesson, a weekly sequence, or a wider learning unit.
Expected product	Model, diagram, technological map, booklet, construction, presentation, digital object, or exhibition	Makes learning visible and gives pupils a concrete result that can be assessed and improved.

The classification in Table 1 demonstrates that STEAM project work should not be reduced to one fixed format. A teacher may select a short-term informational project when pupils need to collect and summarize simple facts about animals, water, weather, or plants. The teacher may select a creative project when learners are expected to draw, construct, or represent a natural process. A practice-oriented project is suitable when learners solve a small problem, such as designing a simple model of water conservation, creating a classroom plant-care schedule, or constructing a visual model of the solar system.

A third result is the identification of teacher competencies required for STEAM project design. Teachers need to define the goal of the activity, formulate tasks appropriate to the goal, select educational material, develop questions and instructions, justify the methodological structure, diagnose pupils' current knowledge, and assess the results. These competencies show that STEAM technology is demanding. It requires professional planning and cannot be implemented successfully only by giving pupils materials and asking them to "make something." Effective STEAM work depends on a well-designed pedagogical process.

The analysis also indicates that educational process design must cover all components of the lesson: the technological process, management of learner activity, tools, information, and socio-economic or organizational support. Educational technology should be selected according to the individual characteristics of pupils, while project strategies should also correspond to the individual teaching style of the educator. The quality of the design depends on the strength of feedback between teacher and learner, the clarity of the lesson content, and the coordination of all factors within the time allocated for the lesson.

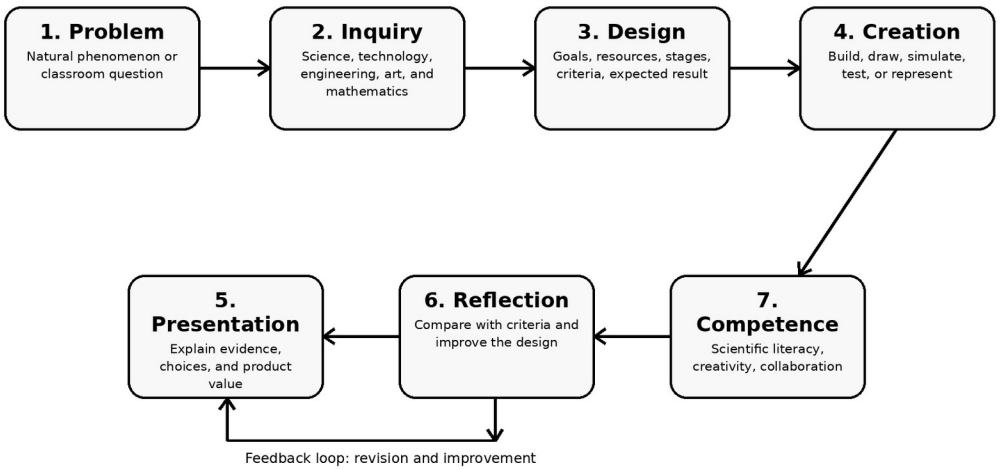


Figure 1. STEAM project-design model for primary natural science education

Figure 1 presents the proposed model for applying STEAM project design in primary natural science education. The model begins with a problem situation because young learners understand science more deeply when it is connected with a visible object, local need, or real classroom question. The second stage is interdisciplinary inquiry, where learners connect the natural science topic with measurement, construction, drawing, digital tools, or practical problem solving. The third stage is project design, in which goals, resources, criteria, and expected results are planned. The fourth stage is modeling and creation, where pupils construct, draw, simulate, test, or represent their solution. The final stages include presentation, reflection, assessment, and competence growth.

A final result concerns the educational outcomes of STEAM technology. The approach contributes to scientific literacy because learners observe, compare, test, and explain. It contributes to technological literacy because pupils use tools, materials, digital resources, or simple mechanisms. It supports engineering thinking because learners design and improve objects or processes. It develops artistic expression because pupils represent ideas visually and creatively. It develops mathematical thinking because pupils measure, count, classify, and interpret simple data. Therefore, STEAM technology creates a wider competence environment than a traditional single-subject lesson.

5. Discussion

The findings suggest that STEAM technology is most effective when it is interpreted as a pedagogical system rather than as a set of isolated activities. Some teachers may associate STEAM only with robotics, expensive laboratories, or digital equipment. However, in primary natural science, STEAM can begin with simple and available materials: paper, cardboard, natural objects, water, plants, measuring tools, recycled materials, drawings, charts, and classroom observations. What matters most is not the cost of the resources but the quality of the educational design.

The discussion of project types also shows that teachers should select the scale of the project carefully. Long-term and complex projects can be valuable, but they may be difficult for young learners if the task is too abstract or if the stages are not clearly organized. For primary school pupils, short projects are often more appropriate. A short project may be completed during several lessons or even within one lesson if the problem, task, materials, and expected product are clear. Medium-term projects may last from a week to a month and can be used when learners

collect observations, for example by monitoring plant growth or weather changes. Long-term projects may be used for broader units but require stronger guidance and parental or school support.

The role of the teacher is central. In STEAM lessons, the teacher is a designer, organizer, consultant, facilitator, and evaluator. The teacher must prepare the project structure before the lesson, but also allow learners to make choices during the activity. This balance is important. If the teacher controls every step, the project becomes a traditional task with a decorative name. If the teacher gives too much freedom without criteria, pupils may become confused and the learning outcome may be weak. Therefore, effective STEAM instruction requires structured creativity: clear goals combined with opportunities for learner initiative.

Another important issue is assessment. Traditional assessment often focuses on correct answers, while STEAM assessment should include the process as well as the final product. A pupil's project may be evaluated according to scientific accuracy, creativity, teamwork, clarity of presentation, use of materials, and ability to improve the design after feedback. Assessment criteria should be explained before the activity begins so that pupils understand what is expected. This also supports self-assessment and reflection, which are important for the formation of independent learning skills.

STEAM technology is also connected with the formation of social skills. Group projects require pupils to distribute tasks, listen to one another, explain ideas, negotiate, and present a common result. These skills are not secondary; they are part of modern competence formation. In primary education, pupils learn not only facts about nature but also how to participate in shared work. When guided properly, pair and group projects help children develop responsibility, patience, communication, and mutual support.

The integration of STEAM with natural science is especially productive because natural science provides many observable phenomena. Topics such as plants, animals, seasons, weather, water, soil, human health, energy, materials, and the environment naturally invite observation, experimentation, drawing, construction, and measurement. For instance, a lesson on water can include the science of states of matter, technology through simple tools, engineering through a water-filter model, art through diagrams, and mathematics through measurement of volume. Such tasks help pupils see the unity of knowledge rather than studying subjects as separate and unrelated blocks.

At the same time, several methodological conditions must be respected. First, projects should correspond to the age and cognitive development of pupils. Second, instructions should be simple, sequential, and visually supported. Third, the teacher should prepare resources in advance and ensure safety. Fourth, the task should be connected with the curriculum rather than replacing it with unrelated entertainment. Fifth, reflection should be included so that pupils understand what they learned and how they learned it. These conditions make STEAM instruction pedagogically meaningful and sustainable.

The analysis has limitations. Since this article is conceptual and methodological, it does not measure the effect of STEAM technology through experimental data. Future research may compare classes using traditional natural science instruction with classes using structured STEAM projects. Researchers may measure changes in pupils' scientific literacy, motivation, collaboration, creativity, and problem-solving ability. It would also be useful to study teachers' readiness to design STEAM lessons, the availability of resources in schools, and the challenges of adapting international STEAM practices to the national curriculum of Uzbekistan.

6. Conclusion

STEAM educational technology is an important methodological direction for improving the effectiveness of natural science teaching in primary education. It supports the modernization of education by connecting knowledge with practice, integrating several disciplines, and developing competencies required in an innovative society. The analysis presented in this article shows that STEAM is most effective when it is implemented through purposeful project design, modeling, creation, presentation, and reflection.

The article has shown that educational projects may be classified according to the number of participants, dominant search method, nature of the problem, academic scope, duration, and expected product. This classification helps teachers select the most appropriate project format for primary learners. The proposed model demonstrates that a STEAM project begins with a problem situation and develops through interdisciplinary inquiry, project design, modeling, presentation, reflection, and competence growth.

For primary education, small-scale STEAM projects are especially relevant. They allow children to work with concrete materials, understand natural phenomena through action, and develop scientific literacy together with creativity and collaboration. However, the success of STEAM depends on the professional competence of the teacher. The teacher must design the lesson carefully, define expected outcomes, select resources, prepare assessment criteria, and provide feedback throughout the process.

In conclusion, STEAM educational technology should be regarded as a practical and theoretically grounded approach to teaching natural sciences in primary education. Its implementation can contribute to the formation of active, creative, scientifically literate, and socially responsible learners. Further empirical research is needed to test the proposed model in classroom practice and to identify the most effective methodological conditions for its use in different primary school contexts.

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ANALYSIS OF FOREIGN EXPERIENCE IN DEVELOPING THE PROFESSIONAL COMPETENCE OF FUTURE HISTORY TEACHERS BASED ON AN INTEGRATIVE APPROACH

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Abstract. *This article examines foreign experience in developing the professional competence of future history teachers through an integrative approach. The study addresses the need to move beyond fragmented teacher preparation in which historical content, pedagogy, practice, digital literacy, civic education, and reflective activity are taught as separate blocks. Using qualitative document analysis and comparative pedagogical analysis, the paper synthesizes theoretical literature on pedagogical integration with selected teacher-education frameworks and history education approaches from the United States, Finland, England, Germany, Singapore, and the wider European context. The findings show that effective preparation of future history teachers depends on the systematic connection of disciplinary knowledge, historical thinking, source criticism, multiperspectivity, inquiry-based learning, reflective practice, mentoring, and digital-civic competence. International models differ in emphasis: the United States foregrounds inquiry and disciplinary literacy; Finland emphasizes transversal competence and multidisciplinary modules; England connects initial teacher training with early career development; Germany gives theoretical depth to historical consciousness and history didactics; Singapore integrates values, skills, and knowledge in a strategic teacher education model; and the Council of Europe highlights multiperspectivity and epistemic awareness. The paper concludes that the integrative approach provides a strong methodological basis for preparing history teachers who can work creatively, critically, reflectively, and responsibly in contemporary educational contexts.*

Keywords: *integrative approach, professional competence, future history teacher, history education, pedagogical integration, historical thinking, source criticism, multiperspectivity, reflective practice, digital competence.*

Introduction

The professional preparation of future history teachers has become one of the central issues in contemporary pedagogical research because history teaching is no longer limited to the transmission of dates, events, and ready-made narratives. A history teacher is expected to help learners interpret evidence, compare historical explanations, understand the relationship between past and present, and develop civic and moral responsibility. These tasks require a model of teacher education in which subject knowledge, pedagogical knowledge, methodological competence, digital literacy, reflective practice, and value-oriented education are developed together rather than separately.

The integrative approach responds to this need by treating teacher preparation as a coherent system. In this system, disciplinary preparation is connected with didactics, classroom practice, research activity, educational technologies, and the formation of professional values. Such an approach is especially important for future history teachers because history itself is interdisciplinary by nature. Historical explanation requires the use of political, cultural, economic,

geographical, sociological, and ethical perspectives. It also requires the ability to work with sources, evaluate evidence, recognize bias, and understand the existence of multiple interpretations.

Foreign experience provides valuable material for analyzing how this integrative logic can be organized in teacher education. The United States, Finland, England, Germany, Singapore, and European history education initiatives demonstrate different but complementary models. They show that high-quality preparation of history teachers is achieved when professional competence is built through inquiry, source-based learning, transversal skills, practicum, mentoring, historical consciousness, multiperspectivity, and reflective professional development.

The purpose of this paper is to analyze foreign experience in developing the professional competence of future history teachers on the basis of an integrative approach and to identify methodological implications for teacher education. The article is organized in IMRAD format. The introduction explains the research problem and theoretical background; the methods section describes the qualitative and comparative design; the results section presents the main international models and their integrative components; the discussion interprets these findings for teacher preparation; and the conclusion summarizes the main scientific and practical implications.

Literature Review

Pedagogical integration is usually understood as the purposeful connection of knowledge, skills, values, methods, and forms of learning into a coherent educational process. In the literature on pedagogy and educational philosophy, integration is often discussed together with differentiation: as sciences and professional fields become more specialized, education must create conditions for students to synthesize knowledge and apply it to complex problems. Ignatenko (2000) notes that integrative tendencies become increasingly visible as different fields of knowledge interact and penetrate one another. This idea is important for teacher education because the work of a teacher requires the coordination of academic, psychological, methodological, communicative, technological, and ethical dimensions.

Theoretical works on integrative learning emphasize that integration is not a mechanical combination of disciplines but a new quality of educational design. Pivovarova (2009) argues that integrative learning creates conditions for dialectical thinking because it places learners at the intersection of different disciplines and problem situations. In teacher education, this means that future teachers should not study pedagogy, psychology, subject methodology, and practice as isolated courses. They should learn to use these areas together when planning lessons, analyzing learner difficulties, designing tasks, and evaluating learning outcomes.

Interdisciplinary connections have also been treated as an important principle of holistic education. Zverev and Maksimov (1981) described interdisciplinary links as conscious relations between the structural elements of different subjects. This understanding is highly relevant to history teacher education. Historical events are not only political or chronological phenomena; they include cultural meanings, social structures, economic causes, geographical conditions, and moral consequences. Therefore, a future history teacher must be able to show students the complexity of historical processes without reducing them to a single narrative.

Modern international frameworks strengthen this theoretical position. The C3 Framework in the United States presents social studies as an inquiry process that begins with questions and continues through disciplinary tools, evidence, communication, and civic action (National Council for the Social Studies [NCSS], 2013). Finland's national curriculum places transversal competences and multidisciplinary modules at the center of learning (Finnish National Agency for

Education, 2016). England's Initial Teacher Training and Early Career Framework connects initial training with induction and early professional growth (Department for Education, 2024). Singapore's TE21 model integrates values, skills, and knowledge in teacher education (National Institute of Education, 2009). In European history education, multiperspectivity is emphasized as a key principle for interpreting the past from different viewpoints (Stradling, 2003). Together, these sources show that integration is not an optional methodological technique but a major direction in contemporary teacher preparation.

Methods

This study used a qualitative documentary-comparative design. The primary material was the source article on foreign experience in developing future history teachers' professional competence through an integrative approach. The text was fully translated into English, reorganized into IMRAD structure, and expanded into a coherent research paper while preserving its core conceptual focus: integrative approach, professional competence, history teacher education, historical thinking, source work, multiperspectivity, reflective practice, and digital competence.

The analysis was conducted in three stages. First, the theoretical material in the source text was grouped into conceptual categories, including pedagogical integration, interdisciplinary integration, integrative learning, professional competence, and creative-reflective activity. Second, the foreign experience discussed in the text was organized by country or model: the United States, Finland, England, Germany, Singapore, and the Council of Europe/European history education context. Third, these models were compared according to five analytic dimensions: integration of subject and pedagogical preparation, development of historical thinking, source criticism and multiperspectivity, practice and mentoring, and digital-civic competence.

The study does not present experimental data from participants. Instead, it is a theoretical and comparative pedagogical analysis. To make the comparison more transparent, the chart in Figure 2 uses interpretive analytic scores from 1 to 5. These scores are not statistical measurements; they summarize the relative emphasis of each international model as interpreted from the reviewed documents and the source article. The purpose of the scoring is illustrative: to show how different systems emphasize different components of integrative preparation.

The reliability of the analysis was strengthened by using stable comparison criteria across all contexts and by distinguishing between description and interpretation. The results therefore should be read as a conceptual synthesis rather than a quantitative evaluation of national systems.

Results

The Integrative Approach as a Methodological Basis

The analysis shows that the integrative approach serves as a methodological basis for connecting the content, process, and outcomes of future history teacher preparation. In traditional models, historical knowledge, pedagogy, psychology, educational technology, and teaching practice may be offered as separate course blocks. The integrative model, by contrast, requires these elements to function as parts of one professional system. A future history teacher should learn historical content together with methods of teaching that content, ways of assessing historical thinking, strategies for working with primary sources, and forms of classroom interaction that encourage inquiry and reflection.

This finding is consistent with the theoretical literature on integration. Professional competence is not formed only by accumulating knowledge. It emerges when knowledge is applied to professional situations. In history education, this means that students in teacher preparation

programs should learn how to transform disciplinary knowledge into teachable content, how to design source-based activities, how to organize discussion of controversial issues, how to guide students toward evidence-based conclusions, and how to reflect on the results of their teaching decisions.

Table 1. Comparative Features of Integrative Approaches in Selected History Teacher-Education Contexts

Context	Main integrative mechanism	Competence focus	Implication for future history teachers
United States	Inquiry-based social studies and disciplinary literacy through the C3 Framework	Questioning, evidence use, argumentation, and civic action	Teachers learn to organize history lessons as inquiry rather than fact transmission.
Finland	Transversal competences and multidisciplinary learning modules	Cultural competence, multiliteracy, ICT, participation, and sustainability	Teachers connect history with social, cultural, media, and civic themes.
England	Continuity between initial teacher training and early career induction	Professional knowledge, classroom routines, evidence-informed practice, and mentoring	Teacher development is treated as a long-term professional trajectory.
Germany	History didactics focused on historical consciousness and historical culture	Understanding time, memory, identity, interpretation, and historical meaning	Teachers frame history as a discipline of interpretation, not memorization.
Singapore	TE21 values-skills-knowledge model and systematic teacher education reform	Reflective, ethical, innovative, and future-oriented teacher identity	Teachers develop content, pedagogy, values, and reflection as one professional system.
Council of Europe	Multiperspectivity and epistemic awareness in history teaching	Source criticism, viewpoint analysis, democratic culture, and balanced interpretation	Teachers help learners evaluate competing narratives and historical perspectives.

Note. The table synthesizes the main international patterns identified through documentary-comparative analysis.

Foreign Models of Integrative History Teacher Preparation

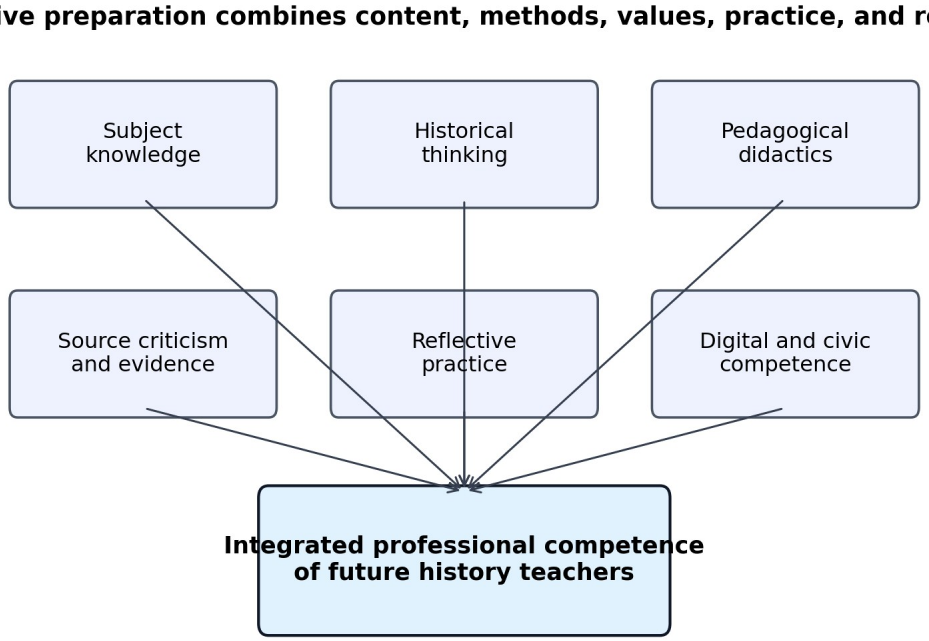
The United States model is strongly associated with inquiry-based learning and disciplinary literacy. The C3 Framework organizes social studies education around questions, disciplinary concepts, evidence, communication, and informed action (NCSS, 2013). For history teacher preparation, this model means that future teachers must be trained to create historical questions, select and evaluate sources, support evidence-based discussion, and guide learners toward reasoned conclusions. The integrative aspect lies in the connection between historical content, disciplinary method, communication, and civic purpose.

Finland demonstrates integration at the curricular level. Transversal competences are built into the curriculum and are not treated as separate subjects (Finnish National Agency for Education, 2016). Multidisciplinary learning modules allow history to be connected with geography, literature, citizenship education, economics, culture, and media literacy. For future history teachers, this model develops the ability to plan complex learning units that cross disciplinary borders while preserving the analytical discipline of history.

England's model is important because it connects initial teacher training with early career development. The 2024 Initial Teacher Training and Early Career Framework presents teacher knowledge and teacher action as connected dimensions of professional growth (Department for Education, 2024). This model is integrative because it does not end professional preparation at university graduation; it extends development through induction, mentoring, and evidence-informed practice. For history teachers, this creates continuity between subject methodology, classroom management, assessment, and reflective improvement.

Germany contributes theoretical depth through the tradition of history didactics. German approaches emphasize historical consciousness, historical culture, and historical competence. In this model, history teaching is not a simple method of delivering content; it is a way of developing learners' orientation in time, memory, identity, and social meaning. This model is significant for future history teachers because it requires them to understand the epistemological nature of history: how historical knowledge is produced, interpreted, contested, and used in society.

Figure 1. Conceptual Model of Integrative Professional Competence for Future History Teachers



Note. The model shows the professional competence of future history teachers as the result of integrating content knowledge, historical thinking, didactics, source criticism, reflection, and digital-civic competence.

Singapore's TE21 model emphasizes the integration of values, skills, and knowledge (National Institute of Education, 2009). It treats teacher education as a strategic system for preparing teachers for twenty-first-century learning environments. For history teacher education,

this approach is valuable because history teachers work not only with content but also with values, identity, citizenship, and social responsibility. The Singapore model therefore supports the development of reflective and ethically grounded professionals.

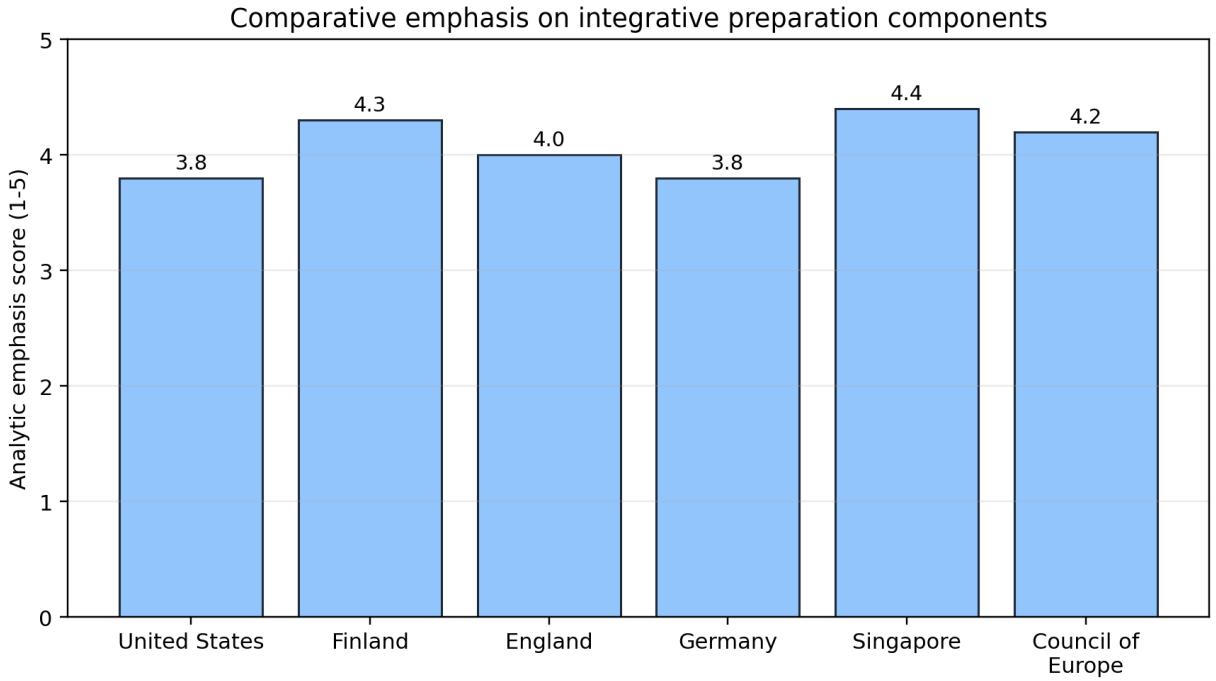
The European history education context, especially through the Council of Europe, highlights multiperspectivity. Stradling (2003) argues that history teaching should help learners examine historical events through different sources, actors, and interpretations. For future history teachers, multiperspectivity requires the ability to manage controversial topics, compare narratives, analyze source positions, and develop democratic classroom culture. It is one of the strongest examples of integration between historical thinking, civic education, and ethical responsibility.

Core Components Identified Across Foreign Experience

Across the reviewed systems, five recurring components of integrative professional competence can be identified. The first is the integration of subject and pedagogical preparation. A history teacher must know history and must also understand how historical knowledge becomes learnable for students. The second is the development of historical thinking, including chronology, causation, continuity and change, comparison, interpretation, and evidence-based reasoning.

The third component is source criticism and multiperspectivity. Effective history teaching requires learners to compare sources, identify authorship and context, recognize bias, and understand that historical narratives may differ. The fourth component is reflective practice and mentoring. Future teachers need opportunities to analyze their own teaching decisions and to receive professional guidance during practice. The fifth component is digital and civic competence. History teachers increasingly work with digital archives, online sources, interactive platforms, and media narratives; therefore, digital literacy must be linked with civic and ethical responsibility.

Figure 2. Comparative Emphasis of Integrative Preparation Components Across Selected Contexts



Note. Scores are interpretive analytic ratings from 1 to 5 based on emphasis in the reviewed models. They are used for conceptual comparison and do not represent statistical measurement.

Discussion

The findings indicate that an integrative approach is not simply a methodological innovation; it is a necessary condition for preparing history teachers for contemporary educational demands. The international models reviewed in this paper differ in structure, but they share a common logic: professional competence develops when knowledge, method, values, practice, and reflection are organized into a coherent system. This is especially important in history education, where teachers work with evidence, interpretation, memory, identity, and citizenship.

For teacher education systems that seek modernization, the first implication is that curricula should reduce fragmentation. Courses in history, pedagogy, psychology, didactics, assessment, educational technology, and practicum should be connected through shared learning outcomes. For example, a module on modern history may be linked with source criticism, lesson design, classroom discussion strategies, digital archives, and reflection on civic values. Such connections help future teachers understand how academic knowledge becomes pedagogically meaningful.

The second implication is the need to strengthen source-based and inquiry-based preparation. If future history teachers are trained mainly through lectures and factual reproduction, they may reproduce the same pattern in school classrooms. International experience suggests that teacher education should include historical questions, document analysis, comparison of interpretations, argumentative writing, oral discussion, and project-based tasks. These forms of preparation cultivate the teacher's ability to develop historical thinking among learners.

The third implication concerns multiperspectivity and ethical responsibility. History teachers often work with topics that contain conflict, memory, national identity, and sensitive interpretations. The Council of Europe model shows that multiperspectivity can help avoid one-sided historical explanation while also promoting democratic culture. However, multiperspectivity should not mean relativism or the rejection of evidence. It should mean disciplined comparison of sources and viewpoints, supported by historical reasoning.

The fourth implication is the importance of mentoring and reflective professional development. England's approach demonstrates that initial teacher training and early career development should be connected. Future history teachers need guided school practice, structured feedback, and opportunities to analyze lesson outcomes. Reflection should not be reduced to general self-evaluation; it should focus on specific professional questions, such as whether students used evidence correctly, whether a task supported historical interpretation, or whether discussion allowed multiple perspectives to be examined responsibly.

Finally, digital competence should be integrated into history teacher education as a professional and ethical skill. Digital tools provide access to archives, maps, timelines, images, oral histories, and interactive learning platforms. At the same time, the digital environment contains misinformation, simplified narratives, and ideological manipulation. Therefore, future history teachers need digital competence not only to use technology but also to teach learners how to evaluate digital historical information critically.

Conclusion

The analysis of foreign experience confirms that the integrative approach is a key methodological basis for developing the professional competence of future history teachers. The most effective models do not separate historical content from pedagogy, practice, civic values, digital literacy, and reflection. Instead, they form a professional preparation system in which all these components support one another.

The comparative analysis showed that the United States emphasizes inquiry and disciplinary literacy; Finland emphasizes transversal competences and multidisciplinary learning; England emphasizes continuity from initial preparation to early career development; Germany emphasizes historical consciousness and history didactics; Singapore emphasizes values, skills, and knowledge; and the European history education context emphasizes multiperspectivity and epistemic awareness. These models together demonstrate that the future history teacher should be prepared as a content specialist, methodologist, researcher, reflective practitioner, digital user, and civic educator.

For practical teacher education, the integrative approach requires curriculum coordination, source-based learning, interdisciplinary modules, reflective practicum, mentoring, and digital-civic tasks. It also requires assessment criteria that evaluate not only what future teachers know but also how they apply knowledge in teaching situations. Future research may develop empirical instruments for measuring integrative professional competence among future history teachers and may test the effectiveness of integrative modules in teacher education institutions.

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DEVELOPING UNIVERSITY STUDENTS' ECONOMIC COMPETENCE IN AN INNOVATIVE EDUCATIONAL ENVIRONMENT: AN INTEGRATIVE FRAMEWORK FOR HIGHER EDUCATION

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Abstract. *This conceptual study develops an evidence-informed framework for strengthening university students' economic competence in innovative educational environments. It combines a structured integrative review with educational design synthesis based on 15 foundational or synthesis-oriented sources addressing human capital, economic growth, professional competence, financial literacy, behavioral decision-making, simulation-based learning, gamification, digital skills, and artificial intelligence in higher education. Sources were assigned a primary thematic code and analyzed for contextual, pedagogical, technological, assessment, and governance implications. The synthesis defines economic competence as the integrated capacity to understand economic concepts, interpret evidence, make reasoned financial decisions, regulate behavior under uncertainty, and use digital tools responsibly in authentic tasks. It proposes a four-domain ecosystem of institutional, sociocultural, technological-infrastructural, and personal-psychological conditions. Within this ecosystem, a five-stage instructional cycle connects problem framing, guided concept development, simulation or action, feedback and reflection, and transfer to new contexts. The framework accommodates virtual market simulations, AI-supported tutoring, digital business incubators, gamified macroeconomic scenarios, and virtual or augmented reality laboratories. These tools have educational value only when aligned with curricula, teacher guidance, inclusive access, ethical governance, and performance-based assessment. The framework provides a coherent basis for pilot testing across Uzbek higher-education programs and empirical evaluation of learning outcomes in practice.*

Keywords*: economic competence, financial literacy, innovative educational environments, human capital, simulation-based learning, artificial intelligence, higher education.*

Introduction

University students routinely make decisions involving income, credit, savings, investment, entrepreneurship, employment, and digital financial services. Economic competence therefore extends beyond familiarity with economic terminology. In this paper, it denotes the integrated capacity to interpret economic information, evaluate alternatives, make responsible decisions under uncertainty, regulate financial behavior, and use relevant digital tools in personal, professional, and civic contexts. The construct combines knowledge, skills, attitudes, judgment, and context-sensitive action, consistent with conceptions of professional competence as responsible and effective performance in real situations (Mulder, 2014).

The rationale for developing this competence draws partly on human-capital and growth theories. Becker (1962) conceptualized education and skill development as investments that can increase productivity and future returns. Solow's (1956) growth model distinguished the

contributions of capital accumulation, labor, and technological progress, whereas Romer (1986) placed knowledge creation and increasing returns at the center of long-run growth. Together, these perspectives suggest that universities contribute to development by building capabilities for innovation, productive decision-making, and adaptation, not merely by transmitting information. Economic competence is thus both an educational outcome for individuals and one element of national human-capital development.

Contemporary economic activity also requires digital, cognitive, and social capabilities. Van Laar et al. (2017) found that 21st-century skills extend beyond technical use of information and communication technologies to include critical thinking, problem-solving, communication, collaboration, creativity, and self-direction. Economic competence must likewise connect economic concepts with data interpretation, digital-platform use, strategic reasoning, and communication. A student who can define inflation but cannot evaluate a loan offer, compare investment risks, or identify misleading financial information has not yet demonstrated functional competence.

Research on financial literacy reinforces the distinction between knowledge and applied behavior. Lusardi and Mitchell (2014) treated financial knowledge as a form of human capital and documented its relevance to consequential household decisions. Meta-analytic evidence indicates that financial education can improve financial literacy and behavior, although effects vary across populations, program designs, and implementation conditions (Kaiser & Menkhoff, 2017). A later synthesis of randomized experiments also reported positive average effects on financial knowledge and downstream behavior, particularly when instruction was purposeful and linked to specific decisions (Kaiser et al., 2022). These findings support curricular intervention but do not justify assuming that exposure to content automatically produces responsible action.

Behavioral theory explains part of this gap. Ajzen's (1991) theory of planned behavior proposes that action is shaped by attitudes, perceived social expectations, intentions, and perceived behavioral control. Kahneman and Tversky's (1979) prospect theory shows that framing, reference points, and loss aversion influence decisions under risk. Economic education should therefore address rational models alongside the psychological processes that can lead students to postpone saving, overreact to losses, follow peers, or anchor judgments to irrelevant information. Guided simulation and reflection can make these tendencies visible before students encounter high-stakes consequences.

Purposefully designed learning environments can provide such practice. Merrill (2002) argued that learning is promoted when students engage with real-world problems, activate prior knowledge, observe demonstrations, apply new knowledge, and integrate it into their lives. Meta-analytic evidence suggests that computer-based simulation games can improve learning when supported by clear instructional design and sustained engagement (Sitzmann, 2011). Gamification research reports generally positive but context-dependent outcomes and cautions that points, badges, and leaderboards cannot substitute for meaningful tasks (Hamari et al., 2014). Research on artificial intelligence (AI) in education documents applications in adaptive support, assessment, and tutoring, while emphasizing educator involvement, verification, privacy, and ethical oversight (Kasneci et al., 2023; Zawacki-Richter et al., 2019).

Economic literacy, financial literacy, and economic competence are related but distinct. Economic literacy generally concerns understanding economic concepts and systems, whereas financial literacy focuses more directly on personal financial knowledge and decisions. Economic competence includes both and adds performance: students must select information, justify a

choice, act through appropriate tools, respond to consequences, and revise their reasoning. This broader construct suits higher education because graduates encounter economic questions as consumers, employees, managers, teachers, entrepreneurs, and citizens. It also supports assessment through authentic cases and performance tasks rather than recall tests alone.

Within this framework, innovation denotes purposeful educational redesign rather than the mere presence of new devices. A learning environment is innovative when institutional policy, curriculum, pedagogy, assessment, and technology are coordinated to expand students' opportunities to make and examine meaningful decisions. This principle matters where universities have unequal infrastructure or rapidly changing digital capacity. Institutions can begin with accessible tools, such as spreadsheets, mobile scenarios, local datasets, and structured peer review, and add advanced simulations or immersive systems only when their educational value is clear. The central design question is not which technology appears newest, but which combination of task, support, feedback, and access develops a specified economic capability.

The preliminary analysis informing this article identified institutional, sociocultural, technological, and psychological conditions relevant to economic competence in Uzbekistan. These elements required integration into a researchable model that explicitly connects theory, pedagogy, technology, assessment, and implementation. The study therefore addresses three questions: (1) Which theoretical traditions provide the strongest foundation for university students' economic competence? (2) Which contextual and pedagogical conditions should be integrated into an innovative educational environment? and (3) How can digital tools be organized within an implementable and assessable instructional framework?

Method

Research Design

The study combined a structured integrative review with educational design synthesis. This approach was appropriate because the aim was not to estimate a new causal effect or report primary data, but to connect theories and empirical syntheses that are often considered separately. It enabled economic-growth theory, competence theory, financial-literacy research, behavioral decision theory, instructional design, simulation research, gamification, digital-skills scholarship, and AI-in-education research to be examined within a single conceptual architecture.

Source Selection

Fifteen sources published between 1956 and 2023 were purposively selected. A source was included if it met at least one of four criteria: it introduced a foundational theory directly relevant to the study; provided a high-level review or meta-analysis; addressed learning design or technology-supported instruction; or clarified competence in professional or digital contexts. Peer-reviewed journal articles and one authoritative scholarly handbook chapter were prioritized. Bibliographic details, publication metadata, and DOI identifiers were checked against publisher, journal, and DOI records before inclusion.

Analytical Procedure

Analysis proceeded in three stages. First, each source received one primary thematic code: human capital and economic growth; financial literacy and behavioral decision-making; competence and digital skills; experiential, simulation, and game-based learning; or AI-supported higher education. These codes produced the descriptive chart reported in the Results section. Second, the sources were coded for design implications, including contextual conditions, target capabilities, instructional processes, technology functions, assessment practices, and risks. Third, convergent concepts were synthesized into a four-domain ecosystem and a five-stage instructional

cycle. A proposed technology was retained only when it could be linked explicitly to a learning mechanism and an assessable component of competence.

Synthesis Matrix

A source-by-construct matrix was used to make the synthesis traceable. Rows represented the 15 sources; columns represented theoretical rationale, definition of competence, learning mechanism, technology function, behavioral mechanism, assessment implication, contextual condition, and risk. A statement was entered only when it reflected a source's central argument or review findings. The matrix was then compared with the major proposals identified in the preliminary analysis. Proposals without a defensible mechanism were reframed as possibilities for future testing rather than as documented achievements. This procedure reduced the risk of attaching educational claims to technologies without adequate conceptual support.

Rigor and Scope

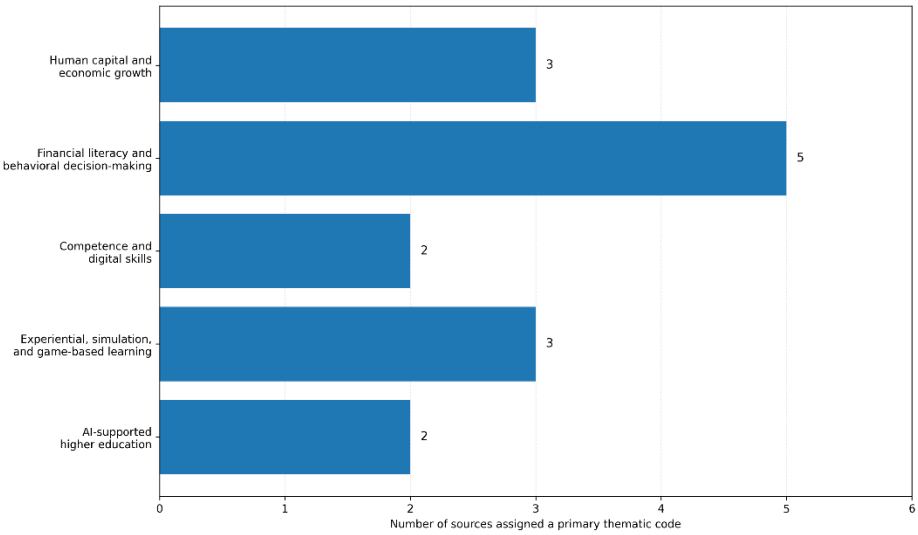
The synthesis emphasized conceptual transparency rather than exhaustive systematic coverage. Because the study analyzed published scholarship and did not involve human participants, identifiable private data, or an intervention, institutional ethics review was not required. To limit overstatement, the paper distinguishes evidence-supported principles from locally proposed applications. The resulting framework is a theoretically grounded design model that requires empirical validation in Uzbek universities.

Results

Thematic Structure of the Evidence Base

The 15-source corpus was distributed across five primary themes. Human capital and economic growth included Becker (1962), Romer (1986), and Solow (1956). Financial literacy and behavioral decision-making included Ajzen (1991), Kahneman and Tversky (1979), Kaiser and Menkhoff (2017), Kaiser et al. (2022), and Lusardi and Mitchell (2014). Competence and digital skills included Mulder (2014) and van Laar et al. (2017); experiential, simulation, and game-based learning included Hamari et al. (2014), Merrill (2002), and Sitzmann (2011); and AI-supported higher education included Kasneci et al. (2023) and Zawacki-Richter et al. (2019). Figure 1 shows the resulting distribution. Because each source received one primary code, the chart represents thematic emphasis rather than the full contribution of each work.

Figure 1. Primary Thematic Emphasis of the Integrative Corpus



Note. Each of the 15 reviewed sources was assigned one primary thematic code for descriptive purposes. The code indicates principal emphasis, not exclusive contribution.

Translating Growth Theory Into Educational Design

The growth theories yielded complementary implications for educational design. Becker's (1962) human-capital approach supports sustained investment in students' knowledge and capabilities, while implying that such investment should build productive capacity rather than credentials alone. Solow's (1956) model highlights the limits of relying solely on capital accumulation; by analogy, purchasing hardware without improving teaching processes is unlikely to produce lasting educational gains. Romer's (1986) endogenous-growth perspective assigns a more active role to knowledge creation, spillovers, and innovation. In university settings, this logic supports collaborative problem-solving, student-generated business ideas, reusable digital resources, and partnerships through which knowledge circulates beyond one classroom. The synthesis therefore treats infrastructure, disciplinary knowledge, and social learning as complementary inputs: infrastructure enables practice, disciplinary knowledge structures it, and interaction allows ideas and strategies to be tested, revised, and shared.

These theories also clarify the appropriate level of inference. A course in economic competence cannot by itself guarantee national economic growth, and the framework makes no such causal claim. Its plausible contributions are intermediate outcomes: better decision quality, stronger readiness for work and entrepreneurship, more effective use of digital financial services, and greater capacity to participate in innovation. Links to broader institutional or economic indicators should be examined only after effects have been demonstrated at student and program levels. This layered logic prevents macroeconomic language from substituting for measurable educational outcomes.

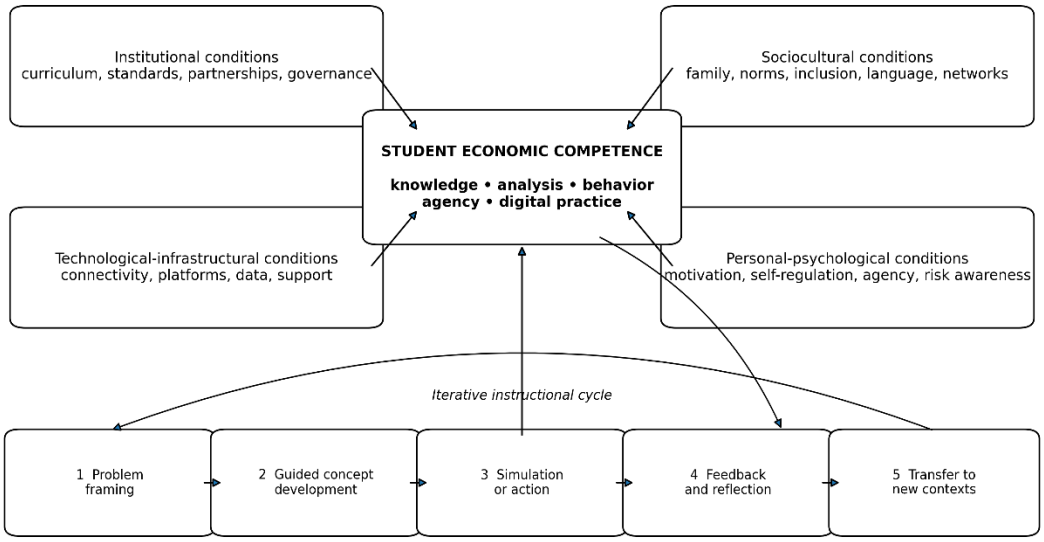
A Multidimensional Definition of Economic Competence

The synthesis yielded five interdependent components. Conceptual knowledge covers inflation, interest, risk diversification, opportunity cost, supply and demand, taxation, credit, entrepreneurship, and the role of institutions. Analytical skill involves interpreting tables, graphs, price changes, loan terms, budgets, and alternative scenarios. Behavioral competence concerns planning, saving, responsible borrowing, resistance to impulsive choices, and revision after feedback. Economic agency includes perceived control, initiative, self-efficacy, and willingness to seek information before acting. Digital-economic practice entails safe use of financial technologies, data tools, simulations, and AI-supported resources. A weakness in one component can restrict the others: knowledge without perceived control may not influence behavior, while digital access without sound judgment can increase exposure to misinformation or risky products.

The Four-Domain Ecosystem

One output of the synthesis is a contextual ecosystem comprising four interacting domains (Figure 2). Institutional conditions include curriculum policy, assessment standards, teacher preparation, partnerships with employers and financial institutions, data governance, and certification. Sociocultural conditions include family financial socialization, peer norms, gender inclusion, language accessibility, community networks, and public attitudes toward entrepreneurship and money management. Technological-infrastructural conditions include reliable connectivity, device access, secure platforms, open economic data, interoperability, technical support, and accessibility for students with disabilities. Personal-psychological conditions include motivation, self-regulation, time management, perceived behavioral control, risk awareness, emotional regulation, and recognition of cognitive bias.

Figure 2. Integrated Ecosystem and Instructional Cycle for Economic Competence Development



Note. The model links four contextual domains to a five-stage instructional cycle. Arrows represent reciprocal influence rather than a fixed linear causal sequence.

The four domains are interdependent and can limit one another. A sophisticated simulation has little value when students lack connectivity, teachers cannot interpret its dashboard, assessment rewards memorization alone, or cultural norms discourage discussion of financial mistakes. Conversely, modest technology can be effective when tasks are authentic, feedback is timely, and institutional support is stable. This systems perspective reflects the broader competence principle that performance is inseparable from the context in which knowledge and skills are enacted (Mulder, 2014).

A Five-Stage Instructional Cycle

The second major output is a five-stage cycle that translates the ecosystem into classroom practice. Stage 1, problem framing, begins with a realistic decision, such as allocating a monthly student budget, comparing loan offers, evaluating a start-up idea, or responding to inflation. Stage 2, guided concept development, introduces the economic principles needed to understand the problem. Stage 3, simulation or action, requires students to decide through a virtual market, spreadsheet, business model, scenario game, or AI-supported dialogue. Stage 4, feedback and reflection, combines teacher commentary, peer comparison, automated analytics, and prompts about cognitive bias to explain why a decision succeeded or failed. Stage 5, transfer, requires application to a new context, such as preparing a personal financial plan, advising a hypothetical household, defending an investment strategy, or pitching a viable enterprise. The sequence applies Merrill's (2002) problem-centered principles and reflects evidence that simulation is most educational when accompanied by instructional support and reflection (Sitzmann, 2011).

Curriculum Architecture

A spiral curriculum is preferable to a single, isolated financial-literacy course. Introductory modules can establish budgeting, inflation, interest, opportunity cost, and information verification. Intermediate modules can add credit comparison, investment diversification, entrepreneurship,

taxation, and interpretation of economic indicators. Advanced modules can require integrated cases involving uncertain forecasts, competing stakeholder interests, regulation, and ethical consequences. Repeated encounters with increasingly complex problems allow students to transfer prior learning to new decisions.

Curricular integration also makes economic competence relevant beyond economics programs. Teacher-education students can design age-appropriate financial-learning activities; engineering students can evaluate project costs and uncertainty; language students can analyze economic communication and misleading claims; information-technology students can examine fintech design and algorithmic risk; and management students can model cash flow, pricing, and workforce decisions. A common framework can support these disciplinary adaptations while allowing tasks and technical depth to vary.

Alignment should be explicit within each module. Learning outcomes must specify the expected decision or performance, learning activities must provide practice in that performance, and assessment must require comparable reasoning. For example, an outcome requiring students to evaluate consumer credit should be supported by authentic loan documents, calculation and comparison tasks, discussion of behavioral framing, and an assessment requiring a justified recommendation. A multiple-choice definition of interest cannot adequately represent that outcome. Clear alignment is necessary if innovative tools are to improve competence rather than merely increase screen time.

Technology Portfolio

The proposed technology portfolio comprises five applications. A virtual stock-market simulator can develop portfolio reasoning, diversification, interpretation of volatility, and emotional control without exposing students to real financial loss. An AI-supported economic tutor can provide explanations, scenario questions, multilingual support, and formative feedback, but its output must be grounded in verified course materials and reviewed for accuracy. A digital business incubator can connect problem identification, business-model design, budgeting, mentoring, pitching, and iterative revision. Gamified macroeconomic scenarios can help students observe delayed consequences of policy choices, provided that game mechanics remain subordinate to learning goals. Virtual or augmented reality laboratories can visualize supply chains, production systems, markets, or spatial resource-allocation problems when immersion adds explanatory value.

The reviewed evidence does not establish that any one tool is inherently superior. Hamari et al. (2014) reported that gamification outcomes depend strongly on context and user characteristics. AI research documents varied educational applications alongside risks involving factual accuracy, bias, privacy, overreliance, and weak pedagogical integration (Kasneci et al., 2023; Zawacki-Richter et al., 2019). The framework therefore defines technology by its instructional function, such as representation, practice, feedback, personalization, or collaboration, rather than by its novelty.

Design Requirements for the Technology Portfolio

Each application requires safeguards and explicit instructional specifications. A market simulator should use delayed or educational market data when appropriate, prohibit real-money transactions, and include structured debriefing on diversification, transaction costs, volatility, and emotional reactions. The learning target is not short-term profit but the quality of reasoning and risk management. An AI tutor should be grounded in approved course content, provide sources for factual claims, signal uncertainty, and redirect high-stakes personal financial questions to qualified

professionals. Data logs should be minimized, protected, and used for formative purposes only under clear consent and governance rules.

A digital business incubator should require evidence of a genuine problem, stakeholder analysis, a transparent cost model, sensitivity testing, and iterative response to mentor feedback. Pitch quality should not outweigh feasibility or ethical impact. Gamified macroeconomic scenarios should represent trade-offs rather than reward a single simplistic policy choice; students should compare short- and long-term consequences and explain who benefits and who bears the costs. VR or AR should be reserved for learning problems in which spatial representation, embodied interaction, or system visualization adds value beyond a conventional screen. These requirements make the technologies accountable instructional tools rather than ends in themselves.

All five applications require explanatory feedback. Scores, rankings, and automated recommendations have limited educational value unless students can inspect the assumptions behind them and challenge or revise the result. Dashboards should therefore display decision histories, relevant concepts, alternative strategies, and prompts for reflection, not outcomes alone. Such feedback makes intuitive biases and social influences available for examination rather than leaving them implicit.

Data Ethics and Consumer Protection

Technologies used for economic learning can expose students to persuasive design, commercial products, and risks to personal data. The educational environment should model the responsible conduct that students are expected to develop. Platforms should collect only data necessary for learning, separate academic records from optional analytics, define retention periods, and provide understandable consent information. Required activities should exclude commercial advertising and undisclosed product promotion. When instructors use real financial products as examples, they should compare alternatives and clarify that the lesson does not constitute individualized financial advice.

Students should also learn to question data quality and algorithmic authority. Economic dashboards may contain outdated values, incomplete indicators, or model outputs based on hidden assumptions. A competent learner should verify dates and sources, distinguish prediction from fact, inspect uncertainty, and recognize that a precise-looking recommendation may still be inappropriate. These practices connect digital literacy with economic judgment and reduce risks associated with AI, fintech demonstrations, and market simulations. Ethical design is therefore a criterion for every stage of the instructional cycle, not an optional topic added after technical instruction.

Assessment Architecture

The framework recommends balanced assessment. Conceptual understanding can be measured through short constructed responses and interpretation tasks. Analytical skill can be assessed through case-based calculations, comparison of alternatives, and evidence-based justification. Behavioral competence can be approximated through repeated choices in simulations, planning quality, and consistency across scenarios rather than through self-report alone. Agency can be assessed through goal-setting, information-seeking, and revision behavior. Digital-economic practice can be evaluated through safe platform use, data verification, source citation, and recognition of algorithmic limitations. The aim is not to convert students' personal finances into grades, but to assess their capacity to reason and act responsibly in protected educational scenarios.

Progression and Mastery

The framework assumes progression from supported to independent performance. Early tasks may provide formulas, worked examples, and decision prompts; later tasks should reduce scaffolding and introduce incomplete information, competing goals, or time constraints. Students should be allowed to revise decisions after feedback because revision demonstrates learning rather than failure. Mastery is evident when a learner can explain the relevant concept, select appropriate evidence, act consistently with that explanation, and transfer the reasoning to a different case. This definition discourages ranking students solely by simulated profit or speed, which may reward luck or excessive risk-taking.

Implementation Matrix

Table 1 translates the model into institutional actions and measurable indicators. The indicators emphasize process and performance because future empirical studies should establish implementation quality before attributing changes in student outcomes to the technologies themselves.

Table 1

Implementation Matrix for an Innovative Economic Competence Environment

Domain	**Mechanism**	**Illustrative institutional action**	**Possible indicator**
Institutional	Curriculum alignment, teacher capacity, partnerships, governance	Map competencies across courses; train instructors; establish data and AI policies; involve employers and financial institutions	Curriculum coverage; trained staff; policy compliance; partner participation
Sociocultural	Norms, inclusion, family and peer learning, language accessibility	Use locally relevant cases; provide multilingual resources; monitor gender and socioeconomic participation	Participation gaps; perceived relevance; accessibility ratings
Technological and infrastructural	Access to secure platforms, connectivity, data, and technical support	Pilot low-bandwidth simulations; provide device access; validate content; maintain technical support	Platform uptime; access rate; completion rate; security incidents
Personal and psychological	Motivation, self-regulation, agency, risk awareness, emotional control	Use goal setting, reflection logs, bias prompts, and repeated decision scenarios	Revision quality; information seeking; risk justification; self-regulation evidence
Instructional process	Problem, concepts, action, feedback, transfer	Design modules around authentic decisions and mandatory debriefing	Performance-task scores; transfer task quality; feedback use

Domain	Mechanism	Illustrative institutional action	Possible indicator
Assessment	Triangulation of knowledge, reasoning, behavior, agency, and digital practice	Combine concept tests, case analyses, simulation records, reflective explanations, and oral defense	Reliability; validity evidence; improvement by dimension

Note. Indicators are proposed for pilot evaluation and require local validation before use in high-stakes decisions.

Discussion

Theoretical Contribution

The framework links macroeconomic and educational levels that are often discussed separately. Human-capital and growth theories explain why competence matters for productivity, adaptation, and innovation (Becker, 1962; Romer, 1986; Solow, 1956), but they do not specify how universities should design instruction. Research on competence and digital skills indicates that the outcome must integrate knowledge with context-sensitive action (Mulder, 2014; van Laar et al., 2017). Financial-literacy evidence shows that education can influence knowledge and behavior, while revealing substantial variation in effects (Kaiser & Menkhoff, 2017; Kaiser et al., 2022; Lusardi & Mitchell, 2014). Instructional and behavioral theories then clarify mechanisms through which an educational environment may help convert knowledge into action.

This integration matters because technically correct economic knowledge can coexist with poor decisions. Ajzen's (1991) model suggests that perceived control and social norms can prevent knowledge from shaping behavior. Kahneman and Tversky (1979) show that framing and sensitivity to loss systematically affect judgments under risk. The framework therefore centers repeated decision-making, explanation, and reflection. Students should not only calculate expected return; they should also examine why a recent loss altered their willingness to take risk, why peers influenced a purchase, or why an attractive monthly payment concealed a high total borrowing cost.

Pedagogical Implications

The proposed cycle is designed to avoid two limitations: lecture-only instruction and technology-first experimentation. Lectures may communicate definitions efficiently but provide little opportunity to practice judgment. Technology-first instruction may generate engagement without conceptual depth. The five-stage sequence instead begins with a problem, introduces relevant concepts, creates a protected opportunity for action, and requires reflection and transfer. This alignment accords with Merrill's (2002) instructional principles and with evidence that simulation gains depend on thoughtful design rather than exposure to a game or platform alone (Sitzmann, 2011).

For instructors, the main shift is from supplying economic answers to designing environments for decision-making. A weekly unit might begin with a household budget disrupted by inflation, continue with a focused explanation of real and nominal values, move to a simulation in which students revise spending and saving, and end with a written defense of the final plan. The teacher remains essential during debriefing: automated scores show what happened, whereas guided discussion examines why it happened and how the reasoning transfers to another situation.

AI Governance and Academic Integrity

AI-supported tutoring can expand access to explanations and individualized practice, but it also creates risks involving inaccurate output, hidden bias, privacy, dependence, and superficial task completion. Earlier reviews found that educator-centered and pedagogical questions often received less attention than technical development (Zawacki-Richter et al., 2019), while research on large language models emphasizes verification, critical thinking, privacy, human oversight, and clear pedagogical strategies (Kasneci et al., 2023). Universities should therefore ground AI systems in restricted knowledge bases where feasible, disclose their use, prohibit entry of sensitive personal financial information, retain teacher oversight, and require verification of consequential claims against authoritative sources. Assessments should demand visible reasoning, reflection, and oral defense so that AI supports rather than replaces judgment.

Equity and Contextualization in Uzbekistan

The preliminary analysis emphasized the need to connect economic education in Uzbekistan with digital transformation, entrepreneurship, and human-capital development. The present framework supports that direction while removing unverified claims about existing platforms and guaranteed outcome percentages. Local implementation should begin with a needs assessment because universities differ in connectivity, staff readiness, student language profiles, regional labor markets, and access to financial institutions. A low-bandwidth spreadsheet simulation with strong facilitation may be more appropriate than an expensive immersive laboratory. Materials should be available in relevant languages, examples should reflect local prices and institutions, and participation should be examined for gender- and income-related differences in access.

Implementation should proceed in stages. During the first phase, universities can map existing courses, establish baseline assessments, train instructors, and develop a small set of validated scenarios. A limited second-phase pilot can compare conventional instruction with the structured five-stage cycle while collecting usability, implementation, and learning data. In the third phase, effective components can be integrated across programs and linked to internships, entrepreneurship centers, and employer partnerships. Decisions to scale should depend on evidence of learning, accessibility, data security, and cost-effectiveness rather than novelty.

Pilot Evaluation Strategy

A rigorous pilot should evaluate the framework in stages. Researchers should first develop an assessment blueprint covering the five components of competence and use expert review to establish content relevance. Cognitive interviews with students should then examine whether scenario wording, data displays, and response options are understood as intended. Reliability should be evaluated separately for knowledge items, analytic rubrics, and repeated simulation measures because these provide different forms of evidence. Construct validity can be investigated by testing whether the dimensions are related yet distinguishable and whether performance is associated with prior coursework, digital confidence, and relevant behavioral indicators without being reducible to any one of them.

An implementation study should also document teacher training, time on task, platform access, technical failures, use of feedback, and adherence to the five-stage cycle. Outcome comparisons should be interpreted only after implementation is shown to be adequate. A feasible design could compare course sections using the structured cycle with sections teaching the same content through conventional methods, while accounting for baseline competence and instructor effects. Interviews and samples of student work could clarify how and why change occurred.

Delayed assessment is needed because immediate improvement may reflect familiarity with the simulation rather than transferable competence.

Sustainability and Cost-Effectiveness

Institutional adoption should consider total cost rather than software purchase alone. Costs include scenario development, translation, teacher preparation, device provision, maintenance, cybersecurity, accessibility adaptation, and time required for feedback. Benefits also extend beyond test-score change and may include reusable learning resources, teacher capacity, reduced dependence on external platforms, stronger employer partnerships, and greater student confidence. A modular strategy is likely to be more sustainable than a single large platform. Universities can begin with open or locally developed cases, validate the pedagogy, and invest in advanced functions only when they address demonstrated needs.

Sustainability also depends on institutional ownership and periodic review. Academic departments should define learning outcomes; technical teams should manage security and interoperability; legal or ethics personnel should review data practices; and students should participate in usability testing. Annual review should remove outdated economic assumptions, revise scenarios after policy or market changes, and audit AI-supported content. Innovation then becomes an institutional learning process rather than a one-time procurement decision.

Limitations and Future Research

This conceptual study used purposive rather than exhaustive source selection. The thematic counts describe the reviewed corpus and should not be interpreted as bibliometric evidence for the field as a whole. The framework has not been tested with students, and its proposed indicators require validation. Future research should develop a multidimensional instrument for economic competence, conduct cognitive interviews, establish reliability and construct validity, and test the instructional cycle through pilot or quasi-experimental designs. Mixed-method studies could examine knowledge gains, decision quality, transfer, student explanations, implementation fidelity, and differential access across demographic or regional groups. Longitudinal research is needed to determine whether performance in simulations predicts later financial or entrepreneurial behavior.

Conclusion

University students' economic competence should be treated as an integrated capability rather than a narrow body of economic facts. The proposed framework combines human-capital reasoning, contextual competence, financial-literacy evidence, behavioral decision theory, problem-centered instruction, simulation, and ethically governed digital support. It organizes these elements into four contextual domains and a five-stage instructional cycle. Virtual markets, AI tutors, business incubators, gamified scenarios, and immersive laboratories can support learning only when each tool serves a defined pedagogical function and is accompanied by reflection, teacher guidance, inclusive access, and performance-based assessment.

For Uzbek higher education, the immediate priority is not universal adoption of expensive technologies. More urgent tasks are to develop coherent curricula, locally relevant scenarios, validated assessments, teacher capacity, and evidence-generating pilots. By using technology for structured practice rather than display, universities can help students develop the knowledge, judgment, agency, and digital responsibility needed for personal financial well-being, productive employment, entrepreneurship, and participation in economic development.

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DEVELOPING SCIENTIFIC THINKING IN CHEMISTRY EDUCATION THROUGH A COMPARATIVE ANALYSIS OF INTERNATIONAL AND NATIONAL PRACTICES

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Abstract. *This article examines the theoretical and practical aspects of developing students' scientific thinking in chemistry education. Based on a comparative analysis of international and national educational practices, the study explores opportunities for developing students' abilities to think scientifically, conduct logical analysis, solve problem-based situations, draw evidence-based conclusions, and connect theoretical knowledge with practical activities. Particular attention is paid to the role of STEAM education, inquiry-based learning, problem-based learning, the competency-based approach, and innovative pedagogical technologies in fostering scientific thinking in chemistry lessons. The article comparatively analyzes the advanced practices of international education and the specific characteristics of national chemistry education, and substantiates the possibilities of adapting effective foreign approaches to the local educational context. The study also provides methodological recommendations for systematically developing students' scientific thinking through the improvement of the content, methods, and forms of chemistry education.*

Keywords: *chemistry education, scientific thinking, scientific reasoning, comparative analysis, international experience, national education, STEAM education, inquiry-based learning, problem-based learning, competency-based approach, innovative pedagogical technologies, logical thinking, critical thinking.*

The necessity of integrating theoretical knowledge and practical skills among students should be regarded as one of the fundamental requirements of the educational process. Such integration contributes to the development of students' thinking, deepens their knowledge, enhances their motivation, ensures interdisciplinary integration, develops their ability to solve problem-based situations, and, most importantly, prepares them for real-life activities. Indeed, **if theory is not reinforced through practice, it resembles knowledge suspended in the air; if practice is separated from its theoretical foundation, it becomes merely a collection of unstructured experiences. Only the integration of theory and practice can serve as a foundation for advancing scientific thinking.**

In developed countries, the process of ensuring the effectiveness of chemistry education, fostering scientific thinking among students, and preparing them for practical life is being advanced through distinctive methodological approaches. The content and methods of education are not limited merely to the transmission of knowledge; they also aim to promote the comprehensive development of the individual, foster independent decision-making, and prepare students for scientific research activities.

For example, in the United States educational system, **inquiry-based learning** is widely employed in chemistry education. This approach enables students to acquire knowledge independently through conducting experiments, making observations, formulating hypotheses,

and testing them. Consequently, inquiry-based learning is regarded as one of the most effective methods for developing scientific thinking.

The methodology of chemistry instruction in the United States is primarily based on a **constructivist approach**, in which students' prior knowledge serves as a foundation for constructing new knowledge, while learners are encouraged to engage in active inquiry through the completion of various tasks. For instance, within the framework of problem-based learning, students are encouraged to address problems arising from real-life situations. Accordingly, learning tasks may be developed around pressing issues such as the chemical causes of environmental pollution, the composition and effects of food additives, and the development of renewable energy resources.

As a result of this process, students not only acquire an understanding of the fundamental principles and laws of chemistry but also learn to relate them to broader socio-economic processes, thereby developing the ability to conduct comprehensive analyses through the application of scientific thinking.

In German schools, the competency-based approach occupies a leading position in chemistry education. Students are provided not only with theoretical knowledge but also with tasks aimed at developing their ability to apply knowledge in various real-life situations, analyze problems, and approach environmental issues from a scientific perspective. The methodological foundations of this process include laboratory work, project-based activities, and interdisciplinary integration. In this regard, chemistry education in Germany is closely interconnected with natural sciences, biology, physics, and ecology, thereby contributing to the development of students' ability to perceive nature as an integrated system. The **dual education** model is of particular importance in Germany, whereby students, alongside classroom-based learning, undertake practical training in industrial enterprises. This approach has also been incorporated into chemistry education. As a result, students study chemical technological processes not only theoretically but also practically, integrating scientific thinking with industrial experience. Furthermore, considerable attention is devoted to laboratory activities in German education, with appropriate conditions provided for students to conduct experiments independently, analyze errors, redesign experiments, and draw conclusions. This, in turn, contributes to the development of the logical and analytical dimensions of scientific thinking.

In Japan, chemistry education combines national traditions with modern technologies. In particular, advanced pedagogical technologies—including elements of robotics, digital laboratories, and software for the virtual modeling of chemical processes—are widely used in the educational process. This enables students to study scientific experiments in safe and visually accessible environments and to develop a deeper understanding of theoretical knowledge by modeling complex chemical processes. Japanese educators place considerable emphasis on the **"Kaizen" philosophy**, which is based on the principle of continuous improvement, and pay particular attention to developing the individual abilities of each student. Such an approach, in turn, serves as an effective means of developing the creative components of scientific thinking.

Another widely used method in Japanese chemistry education is **collaborative learning**, in which students work in small groups to solve complex chemical problems. As a result, each participant learns to substantiate their ideas, provide evidence, and arrive at a common conclusion. This method facilitates the integration of scientific thinking with communication skills and social competencies. In addition, the concept of **STEAM education** (Science, Technology, Engineering, Arts, and Mathematics) has been widely introduced in Japanese schools. Chemistry lessons are

organized in integration with art, design, and technology, which constitutes an important factor in developing students' creative and innovative thinking [6].

In developed countries, interactive methods aimed at increasing students' engagement are widely used in chemistry education. Methods such as **debate, case study, role-play, and simulation** are incorporated into the educational process and contribute to the development of students' independent thinking, scientific reasoning, and ability to analyze different perspectives. In particular, in secondary schools in the United States, students are often engaged in knowledge-sharing activities organized in the form of scientific conferences or laboratory councils. Such practices not only stimulate students' interest in scientific activities but also bring them closer to authentic scientific environments. In Germany and Japan, considerable attention is devoted to addressing environmental problems through chemistry education, while the concept of sustainability is becoming a leading principle in the development of modern science and technology. Therefore, students are assigned practical tasks that require them to analyze environmental problems on the basis of chemical knowledge, such as waste recycling, reducing atmospheric pollution, and developing green energy technologies. This process contributes to the development of the socio-problem-oriented dimension of scientific thinking and enables students to apply their knowledge to real-life problems.

Furthermore, modern information and communication technologies are widely used in chemistry education in developed countries. Digital tools, online laboratories, 3D models, and virtual simulations enable students to study numerous complex chemical processes in greater depth and in a more visually accessible manner. For example, the **PhET Simulations** platform is widely used in the United States, allowing students to explore various chemical processes through virtual experiments and analyze the resulting data. In Germany, the use of specialized software such as **ChemSketch** and **Avogadro** has also become widespread for creating molecular models, studying their properties, and conducting computer-based experiments.

The methods employed in chemistry education in the United States, Germany, Japan, and other developed countries are distinguished by their focus on increasing student engagement, developing scientific thinking, connecting theoretical knowledge with real-life problems, and fostering creative and innovative thinking. The distinctive feature of these methods is that they not only ensure students' thorough mastery of chemical knowledge but also develop competencies related to independent inquiry, logical reasoning, evidence analysis, solving environmental problems, and readiness to contribute to societal development. Therefore, mastering these experiences and adapting them to the local educational context is of significant importance for developing scientific thinking.

The experience of countries with highly developed education systems demonstrates that the development of scientific thinking in chemistry education is primarily associated with creating a didactic system that directs students not toward memorizing ready-made knowledge but toward consciously constructing a logical chain of **problem formulation, hypothesis generation, observation and evidence collection through experimentation, data analysis, modeling, and conclusion drawing**. Although such systems have emerged in different forms in countries such as Singapore, Finland, and South Korea, they share a common essence: bringing learning activities closer to the research cycle, creating problem-based situations within interdisciplinary contexts, and making assessment an integral component of the teaching process. Within such an educational environment, students acquire not only the ability to write reaction equations or perform

calculations but also gradually master the normative practices of scientific thinking through questions such as **“Why?”, “How can we prove it?”, and “Which evidence is stronger?”[4]**

In Singapore, the structure of chemistry lessons is often integrated with a guided inquiry model. Rather than strictly regulating the learning process, the teacher presents a problem-based situation within a rich context—for example, the purification of drinking water or factors affecting food preservation—and then encourages students to formulate hypotheses and develop experimental plans, collect data using measuring devices and sensors, and integrate evidence in multiple formats through graphs, tables, conceptual maps, and molecular models. As a result, students move from a simple question-and-answer dialogue toward an **“evidence–reasoning–conclusion”** logic. Writing experimental reports becomes more than a formal reporting exercise; it develops into an argumentative text that connects theoretical concepts with empirical evidence. Small-scale but logically complete laboratory tasks commonly used in Singaporean schools—experiments involving microscale quantities of reagents that are safe, economical, and easy to repeat—are enriched with metacognitive reflection through reflective writing, question-and-answer journals, and collaboratively edited electronic notebooks. These practices encourage students to perceive errors as opportunities for knowledge construction. Thus, the assessment process itself becomes an important mechanism of instruction.

In Finland, chemistry education is characterized by a **phenomenon-based learning** approach. Learning materials are not organized merely as a sequence of isolated topics but rather as a system of projects aimed at explaining the chemical “internal mechanisms” underlying broader socio-environmental phenomena, such as energy efficiency, environmental sustainability, and material cycles. Teachers, operating within a context of high autonomy and trust, collaboratively develop assessment criteria, while self-assessment and peer assessment are systematically implemented. Alongside laboratory activities, field research, practical tasks closely connected with local industries, and project-based activities aimed at reducing environmental footprints are integrated into the learning process. In such an environment, scientific thinking develops not merely as formal logical reasoning but as a form of systemic thinking intertwined with ethical and social decision-making. Students begin to perceive the outcomes of chemical knowledge in direct relation to quality of life and indicators of sustainable development.

In South Korean schools, chemistry education is deeply integrated with modern information and communication technologies within a context characterized by high academic expectations and a competitive learning environment. Digital simulations, probe sensors capable of collecting real-time data, rapid assessment tools, and elements of the **flipped classroom** approach are combined in smart classrooms. As a result, more classroom time can be devoted to discussion, argumentation, and the analysis of complex problems, while homework encompasses preparatory activities through video lessons and interactive tasks. Particularly at the interface between theory and practice, digital experiments involving kinetics, equilibrium, and electrochemistry enable students to modify parameters and compare model outcomes with empirical measurements. This encourages students to move beyond merely applying formulas and instead critically analyze models, explain discrepancies, and reconsider initial assumptions.

An analysis of the practices of these countries reveals several common didactic principles. First, **inquiry-oriented teaching** structures the natural logic of lessons through the stages of **Engage, Explore, Explain, Elaborate, and Evaluate**. Second, problem-based and project-based learning begins with real-life situations and creates a genuine need for theoretical concepts. Third, modeling and multiple representations establish systematic connections between the microscopic

level, macroscopic observations, and mathematical or graphical representations. These connections encourage students to synthesize abstract concepts with sensory experience and quantitative analysis, thereby strengthening a scientific-thinking skill characterized by moving from **multiple representations toward unified meaning**. Fourth, evidence-based debates, written argumentation, explanatory peer assessment, short-cycle formative assessment, and a culture of discussing errors contribute to valuing a **well-supported answer** rather than merely a "correct answer."

Laboratory activities in chemistry education are also being reconceptualized, shifting from **"following prescribed procedures"** toward **"research projects."** Students are actively involved in essential components of scientific methodology, including selecting measurement strategies, evaluating sources of error, planning safety protocols, processing data, and representing uncertainty. Within this approach, microscale experiments consistent with the principles of green chemistry are increasingly preferred because they are safe, inexpensive, and easily repeatable, thereby providing favorable conditions for developing a culture of verification and systematic inquiry. Digital tools, data-recording tables, simulators, and basic coding for data analysis bring laboratory work closer to contemporary scientific practice and naturally incorporate elements of statistical thinking [1].

Assessment systems are also being enriched in terms of content and structure. Rather than relying on a single criterion based primarily on a final test, assessment is increasingly transformed into a multi-source and longitudinal mechanism supported by portfolios, project presentations, oral and graphical argumentation, quick-writing activities, concept inventories, and practical work protocols. As a result, assessment becomes not merely a means of selecting or ranking students but a feedback mechanism for self-monitoring, refining thinking strategies, and restructuring knowledge. Methodological support for teachers, lesson observation, collaborative planning, small-scale research, and sharing outcomes within professional communities are important conditions for the sustainable implementation of pedagogical innovations.

From the perspective of adaptation to the local context, these experiences should not be copied mechanically; rather, their fundamental principles should be adapted to the existing curriculum, resources, and cultural context and integrated gradually. For example, opening each unit with a real-life phenomenon—such as drinking water, food additives, or air quality—planning mini-research projects, requiring students to prepare laboratory reports, introducing at least one microscale "research project" task within each topic, and organizing portfolio-based reflection at the end of the learning cycle can serve as effective initial steps. In addition, enriching teacher discourse with questions such as **"How can you prove it?", "Which evidence is stronger?", and "What result would another model produce?"** can help structure classroom dialogue around evidence, develop language competencies, and strengthen students' ability to express ideas in a scientific style while maintaining an appropriate distribution of cognitive load.

The practices of educationally advanced countries such as Singapore, Finland, and South Korea demonstrate that scientific thinking can be developed by transforming chemistry education from a **"collection of knowledge" into a "school of research-oriented thinking,"** by turning lessons into phenomenon-centered and evidence-based learning experiences enriched with modeling and argumentation, and by embedding assessment directly into the learning process.

In addition, it is appropriate to mention Canada, the Netherlands, Estonia, Switzerland, Australia, New Zealand, Israel, as well as Shanghai (China), Hong Kong, and Taiwan in East Asia as educationally advanced systems that are consistently implementing methodological innovations

in chemistry education. In these countries and educational systems, chemistry instruction is progressively oriented toward competencies, while assessment systems rely on formative and criterion-referenced approaches. Laboratories are generally organized around safety and the principles of **green chemistry** and are often equipped with inexpensive microscale kits and digital sensors. In Canada, **Argumentation-Driven Inquiry (ADI)** and the **Claim–Evidence–Reasoning (CER)** framework deepen students' abilities to formulate chemical problems, propose hypotheses, and logically interpret experimental data. For example, in acid–base titration, the selection of an indicator, interpretation of a titration curve, and evaluation of sources of error can be systematically integrated into a single written report. At the same time, teachers' assessment criteria distinguish evidence quality, measurement accuracy, and the depth of logical reasoning as separate dimensions.

In the Netherlands, **context-rich problems** and modeling cycles—**model construction, prediction, experimentation, and model revision**—play an important role. Ideas at the molecular level, such as interfacial phenomena and interactions among particles in solutions, are connected with macroscopic observations. Students are provided with opportunities to iteratively reconcile laboratory results with particle-level kinetic representations through simple simulations and visual tools. This develops the ability to examine the correspondence between a model and reality, which is a central component of scientific thinking.

The Estonian experience is characterized by strong digital infrastructure and active professional teacher communities. Through PhET, simple sensors, and applications for rapid data visualization, changes in reaction rates, energy transfer, or enthalpy during acid–base neutralization can be recorded automatically in real time. Within the **teacher-as-researcher** model, lesson scenarios are tested in small cycles and redesigned on the basis of collected data. This process encourages metacognitive reflection among students, particularly systematic consideration of questions such as **"By what criteria do I consider a particular piece of evidence sufficient?"**

In Switzerland, although chemistry education is closely connected with industry through the dual system, the sequence of **"safe experiment–accurate reporting–quality control"** is also used as a methodological foundation in general education schools. Through microscale laboratory practices involving small quantities of reagents, low risks, and short durations, models of spectroscopic and analytical approaches can be introduced. Students thereby develop an early understanding of scientific and normative practices such as measurement reliability, calibration, and the use of control samples.

In Australia and New Zealand, **Socio-Scientific Issues (SSI)** are placed at the center of learning, with chemical content closely integrated with environmental, public health, and economic dimensions. Small research projects concerning water quality, pesticide residues, or airborne particles are organized, enabling students to evaluate the reliability of evidence sources, analyze stakeholder perspectives, and defend their recommendations. In assessment, conceptual complexity is progressively deepened through the use of the **SOLO taxonomy** and **backward design**.

In Israel, within STEM integration, computationally oriented elements of chemistry—such as basic modeling and data analysis—are combined with ADI. For example, algorithmic thinking in balancing chemical equations or analyzing reaction pathways is connected with reflective reasoning. Controversial questions, such as the limitations of Le Chatelier's principle, pH stability

in buffer solutions, and the relationship between kinetics and thermodynamics, are examined through rigorous standards of written and oral argumentation.

In East Asia, despite the high level of examination pressure in Shanghai, Hong Kong, and Taiwan, inquiry-oriented laboratories, microsensors, and remote laboratories have strengthened the **"experimental data–theory–problem"** triad over the past decade. Bilingual resources and 3D molecular visualizations deepen conceptual understanding, particularly by connecting topics such as chemical bonding, hybridization, and molecular geometry with spatial perception.

In Central Europe, the Czech Republic and Poland have combined **IBSE (Inquiry-Based Science Education)** with cost-effective resources, promoting microscale practical activities, chemistry experiments based on common household materials, and green chemistry guidelines. This provides resource-constrained schools with a reliable, safe, and conceptually productive pathway for developing scientific thinking.

Across these countries, the common methodological core can be summarized as follows:

institutionalizing the **problem–hypothesis–experiment–evidence–conclusion** cycle, with a clearly defined product assigned to each stage, such as a hypothesis template, experimental design sheet, data table, or evidence-based inquiry report;

systematically translating among the **microscopic–macroscopic–symbolic levels (Johnstone's triangle)** through modeling cycles in every lesson, thereby practicing continuous transitions between molecular representations, observations, and chemical notation;

embedding **formative assessment**—including diagnostic questions, exit tickets, peer and self-assessment, and error analysis—throughout the lesson and using transparent criteria to evaluate the quality of evidence and depth of reasoning;

integrating safety and **green chemistry** into laboratory work not merely as procedural instructions but as an integral component of scientific culture, including the standardization of microscale kits and waste-reduction protocols;

connecting topics with real-life situations through locally relevant contexts, particularly by integrating water resources, food chemistry, and materials chemistry with regional problems.

When implementing these core approaches in the local educational context, existing strengths and tasks based on students' real-life experiences should first be incorporated into a strategic framework. Mini-projects can be organized around regional economic sectors such as mineral fertilizers, mining, sericulture, and pharmaceutical production. Students can be trained to analyze evidence in terms of source reliability, experimental reproducibility, and compliance with normative requirements. Assessment can then be conducted across three dimensions: **conceptual understanding** (e.g., correctly identifying the type of reaction), **scientific practice** (measurement, procedural discipline, and safety), and **argumentation**.

Within professional teacher communities, a **"small experiment–rapid analysis–micro-improvement"** cycle can be established. At the end of each month, lesson scenarios can be refined through brief data-sharing sessions and open lessons. A formative feedback system can be strengthened through a short **conceptual diagnostic** consisting of two or three targeted questions before the lesson and an **exit ticket** after the lesson. This would enable the early identification of students' misconceptions.

As a final recommendation, it would be appropriate to design a **"compact core" model** integrating the methods discussed above: modeling cycles, formative assessment, microscale laboratory activities, one "big question" for each topic, and two stages of "finding supporting evidence." Contextual tasks could then be reviewed collaboratively each month. Such an

integrated model would facilitate the gradual and sustainable development of students' scientific thinking based on logical reasoning, evidence, safety, and adherence to scientific standards.

Developing Thinking through STEAM and Project-Based Learning Approaches

The **STEAM approach (Science, Technology, Engineering, Arts, and Mathematics)** integrates chemistry with technological projects, engineering thinking, visualization through art, and mathematical modeling. As a result, students' scientific thinking is enriched not only by conceptual and experimental competencies but also by project-based thinking, aesthetic expression, communication, and collaborative problem-solving skills. In particular, applying the engineering design cycle—**problem identification, requirements definition, generation of alternatives, prototyping, testing, and improvement**—to chemistry projects teaches students to take responsibility for outcomes and make evidence-based optimization decisions.

To implement such approaches in the local context, it is advisable to gradually modernize existing laboratory facilities, develop modules based on inexpensive and safe reagents, improve teachers' methodological competence through professional exchange, introduce transparent assessment criteria and portfolios, and establish collaborative project pathways with local industries and higher education institutions. In this way, chemistry education can develop students' scientific thinking not merely as a collection of facts but as the capacity to make responsible decisions within socio-technical systems.

In the education system of Uzbekistan, the development of scientific thinking through chemistry education has consistently occupied a central position. The reforms currently being implemented in this area require large-scale changes not only in terms of educational content but also at the level of methodological and pedagogical approaches. By fostering and developing scientific thinking, students can be guided not only toward acquiring theoretical knowledge but also toward developing the ability to solve problems independently in real-life contexts.

An examination of local experience demonstrates that the development of scientific thinking in chemistry education is reflected in the state educational programs, textbooks, and methodological guidelines of the Republic of Uzbekistan. These documents identify the formation of the theoretical and practical foundations of chemical knowledge, the development of elements of chemical thinking, and the formation of ecological, technological, and scientific worldviews among students as key objectives of chemistry education. Furthermore, the methodological foundations of approaches aimed at developing scientific thinking in Uzbek chemistry education focus on developing students' abilities in scientific observation, analysis, generalization, experimentation, and logical conclusion-making. In this process, teachers do not merely transmit ready-made knowledge; rather, they activate scientific thinking by encouraging students to engage in inquiry, solve problem-based situations, and think independently.

An important characteristic of local experience is that the development of scientific thinking in chemistry education is often achieved through the integration of different methodological approaches. Traditional lecture-based instruction is complemented by interactive methods, experimental activities, project-based assignments, and tasks based on real-life experiences. For example, rather than requiring students simply to memorize complex organic and inorganic chemical reactions, increasing attention is being given to explaining their essence and developing causal relationships in students' thinking by analyzing the causes, conditions, and consequences of reactions in a logically consistent manner.

Approaches developed by local scholars and methodologists place particular emphasis on developing scientific thinking through the use of students' real-life experiences in chemistry

education. By scientifically explaining familiar phenomena encountered in everyday life—such as food spoilage, corrosion of metals, changes in air quality, or the effects of household chemical products—students not only expand their conceptual understanding but also develop their scientific thinking. From this perspective, the methodology of **contextual teaching**, that is, the use of tasks based on real-life situations, is becoming increasingly widespread in chemistry education in Uzbekistan. This methodology directs students toward solving real-life problems rather than merely recalling chemical knowledge and encourages them to apply that knowledge in practice. For example, tasks such as **"The Effects of Preservatives Used in the Food Industry," "Water Purification Methods and Their Chemical Foundations,"** and **"Environmental Problems Associated with the Combustion of Natural Gas and Coal"** contribute to the development of environmental responsibility, logical reasoning, and scientific thinking among students.

Integrative approaches are also widely used in chemistry education in Uzbekistan. By its very nature, chemistry is closely connected with biology, physics, geography, technology, and mathematics. Integrating chemistry with these disciplines contributes to broadening students' scientific thinking.

The approaches aimed at developing scientific thinking in Uzbek chemistry education are multidimensional and are implemented through curricula, methodological guidelines, experimental activities, innovative technologies, and tasks based on real-life experiences. Taken together, these approaches contribute to students' ability to think logically, understand cause-and-effect relationships, and develop scientific perspectives.

The scientific works of scholars who have made significant contributions to the development of educational methodology in Uzbekistan, including **R. Djurayev, R. Ishmuxamedov, A. Abduqodirov, A. Pardayev, N. Sayidaxmedov, Sh. Abdullayeva, U. Xodjamqulov, U. Begimqulov, B. Adizov, A. Maxmudov, D. Maxmudova, B. Xodjayev, Z. Axrorova, U. Tolipov, and M. Usmonboyeva**, are also noteworthy. Their research extensively addresses the use of pedagogical technologies in the educational process and the development of students' creativity and research skills. R. Ishmuxamedov's views on pedagogical innovations emphasize combining laboratory activities with problem-based tasks, thereby activating students' scientific thinking.

The studies of **M. N. Abdullayeva, A. A. Azizqulov, Sh. Qo'shoqov, Z. Davronov, N. A. Shermuxamedova, Sh. Shayakubov, B. Qodirov, I. Saifnazarov, G. V. Nikitchenko, and B. U. Qosimov** are also important for elucidating the conceptual and methodological foundations of scientific research. Their perspectives focus on the methodological substantiation of students' independent research activities, the gradual acquisition of scientific concepts, and the development of logical thinking through practical activities within this process.

Regarding the development of scientific thinking through learners' independent work, F. M. Zikriyoyev argues that a creative approach to education can produce effective results by integrating laboratory experiments with students' independent activities. Research conducted by G. B. Kurbanova focuses on improving the competencies of gifted students and substantiates the need to employ innovative approaches to developing scientific research skills.

An analysis of international and national experiences in developing scientific thinking in chemistry education demonstrates that their common objective is to foster students' independent thinking, scientific research competencies, creativity, and innovative approaches. However, these objectives are realized through different methodological, pedagogical, and organizational frameworks. At the same time, alongside their similarities, significant differences can also be

observed, highlighting the need to integrate national and international experiences within the global educational space.

First, the **similarities** can be identified in the recognition of learners' scientific research activities as an integral component of the educational process in both local and international research. The scientific and methodological perspectives developed by scholars such as **R. Djurayev, R. Ishmuxamedov, A. Abduqodirov, N. Sayidaxmedov, U. Tolipov, and M. Usmonboyeva** envisage the development of scientific thinking among students through pedagogical technologies. Similarly, the works of scholars from the Commonwealth of Independent States, including **V. P. Bespalko, P. Ya. Galperin, and M. V. Klarin**, extensively address the methodological foundations for improving educational effectiveness and involving students in research activities. In this respect, local and international approaches share a common orientation: encouraging students to acquire knowledge actively and independently while creating a favorable environment for the development of scientific thinking.

Another similarity is that both local and international scholars emphasize the development of students' research competencies through innovative pedagogical technologies (**B. Adizov, U. Begimqulov, B. N. Kireev, A. Gotlib**). This demonstrates that the effective use of technology in developing scientific thinking has become a global educational trend. In addition, scholars' research demonstrates a shared emphasis on considering learners' psychological characteristics and abilities (**T. L. Shaposhnikova, V. M. Krol, I. P. Pastuxova, Yu. Abdullayev, J. Yo'ldoshev, O'. Hoshimov**).

Although the experiences of Uzbekistan and foreign countries in developing scientific thinking in education demonstrate considerable alignment, the educational systems of foreign countries tend to place greater emphasis on the practical and economic dimensions of this process, whereas the national system has developed more extensively elaborated methodological foundations. Therefore, for Uzbekistan, the effective adaptation and implementation of international experience—particularly through integrating students' scientific research activities with industrial enterprises and innovation centers, as well as strengthening financial support mechanisms—constitute important and pressing priorities. At the same time, foreign countries may, in turn, draw inspiration from the methodical developments of Uzbek scholars based on creative and innovative approaches. This direction may be regarded as one of the distinctive and valuable pathways for enhancing the effectiveness of education.

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INTELLECTUAL DEVELOPMENT OF PRIMARY SCHOOL STUDENTS THROUGH AN INDIVIDUALIZED PEDAGOGICAL APPROACH

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Abstract. *This conceptual study reformulates the intellectual development of primary school students as a dynamic, observable, and instructionally manageable process. Its purpose is to determine how an individualized pedagogical approach can support reasoning, attention, memory, knowledge transfer, metacognition, and learner agency without fragmenting the class or assigning children to fixed ability categories. The study used theoretical analysis, comparative synthesis, and pedagogical modeling of foundational developmental theories and contemporary evidence on differentiated instruction, cognitive load, formative assessment, and self-regulated learning. The analysis produced a six-stage adaptive cycle consisting of diagnostic profiling, individual goal setting, adaptive task design, scaffolded practice, formative feedback, and reflection with subsequent revision of the learner profile. Four developmental levels and corresponding pedagogical responses were also specified. The results indicate that effective individualization does not mean preparing an entirely separate curriculum for every child. It requires common curricular goals combined with flexible variation in task complexity, support, pace, representation, and modes of response. The article further argues that individual differences should be treated as temporary diagnostic information rather than permanent labels and that the popular practice of matching instruction to presumed learning styles lacks sufficient evidential support. The proposed model integrates whole-class instruction, flexible grouping, guided practice, and independent application into a coherent classroom system.*

Keywords: *primary school student, intellectual development, individualized instruction, differentiated teaching, formative assessment, scaffolding, metacognition, learner agency.*

Аннотация. *В статье интеллектуальное развитие учащихся начальной школы рассматривается как динамический, наблюдаемый и педагогически управляемый процесс. Цель исследования состоит в определении возможностей индивидуализированного подхода для развития рассуждения, внимания, памяти, переноса знаний, метакогнитивной регуляции и учебной субъектности без разделения класса на устойчивые категории способностей. Методологическую основу составили теоретический анализ, сравнительный синтез и педагогическое моделирование положений возрастной психологии, дифференцированного обучения, теории когнитивной нагрузки, формирующего оценивания и саморегулируемого учения. В результате разработан шестиступенчатый адаптивный цикл, включающий диагностику, постановку индивидуальной цели, проектирование задания, педагогическую поддержку, формирующую обратную связь и рефлексию с последующим уточнением профиля ученика. Обоснованы четыре уровня интеллектуального развития и соответствующие педагогические действия. Показано, что индивидуализация предполагает сохранение общих*

образовательных целей при гибком изменении сложности, темпа, объема поддержки, способов представления материала и форм ответа.

Ключевые слова: *учащийся начальной школы, интеллектуальное развитие, индивидуализированное обучение, дифференциация, формирующее оценивание, педагогическая поддержка, метакогниция, учебная субъектность.*

Annotatsiya. *Maqolada boshlang‘ich sinf o‘quvchilarining intellektual rivojlanishi dinamik, kuzatiladigan va pedagogik jihatdan boshqariladigan jarayon sifatida talqin etiladi. Tadqiqotning maqsadi sinfni qat’iy qobiliyat guruhlariga ajratmagan holda individual yondashuv orqali mulohaza yuritish, diqqat, xotira, bilimni yangi vaziyatga ko‘chirish, metakognitiv boshqaruv va o‘quv subyektligini rivojlantirish imkoniyatlarini aniqlashdan iborat. Nazariy tahlil, qiyosiy sintez hamda pedagogik modellashtirish usullari qo‘llanildi. Natijada diagnostik profil tuzish, individual maqsad belgilash, moslashtirilgan topshiriq loyihalash, bosqichma-bosqich yordam ko‘rsatish, formativ qayta aloqa va refleksiya orqali profilni yangilashdan iborat olti bosqichli adaptiv sikl ishlab chiqildi. Shuningdek, intellektual rivojlanishning to‘rt darajasi va ularga mos pedagogik choralar asoslandi. Individualizatsiya har bir o‘quvchi uchun alohida o‘quv dasturi tuzish emas, balki umumiy maqsadlarni saqlagan holda topshiriq murakkabligi, sur’ati, ko‘mak hajmi, axborotni taqdim etish va javob shakllarini moslashtirish ekanligi ko‘rsatildi.*

Kalit so‘zlar: *boshlang‘ich sinf o‘quvchisi, intellektual rivojlanish, individuallashtirilgan ta’lim, differensial ta’lim, formativ baholash, pedagogik ko‘mak, metakognitsiya, o‘quv subyektligi.*

INTRODUCTION

Primary education is the period in which learners acquire not only basic literacy and numeracy but also the intellectual habits that regulate subsequent learning. The capacity to compare, classify, infer, justify, monitor an error, and transfer a principle to a new situation develops through systematic participation in culturally organized activity. Developmental perspectives represented by Vygotsky, Piaget, and Bruner differ in their explanatory emphasis, yet they converge on a central proposition: intellectual growth is not the mechanical accumulation of information; it involves qualitative changes in the way a child organizes experience and uses cognitive tools [1–3]. For this reason, the effectiveness of a primary classroom cannot be evaluated only by the amount of material covered. It must also be judged by whether instruction expands the learner’s capacity to think independently, regulate cognitive effort, and act meaningfully with knowledge.

The practical difficulty is that children enter the same classroom with different levels of prior knowledge, language development, attention control, working pace, motivation, and confidence. A uniform task may be insufficiently demanding for one learner and cognitively inaccessible for another. The individual approach is intended to address this variation, but it is often interpreted too narrowly. In some classrooms it is reduced to giving weaker learners fewer exercises and stronger learners more exercises; in others it is treated as permanent ability grouping or as a demand to prepare a separate lesson for every child. These practices can increase workload, lower expectations, and stabilize temporary differences as fixed identities. Differentiated instruction, by contrast, is most defensible when it maintains shared curricular purposes while adapting the route, degree of support, and form of intellectual activity [4]. A systematic review of differentiation in primary education similarly indicates that isolated techniques are less reliable

than coherent combinations of assessment, targeted instruction, classroom organization, and teacher expertise [5].

Intellectual development in this article is defined as the progressive improvement of cognitive operations, metacognitive regulation, and purposeful learner agency. Cognitive operations include attention, perception, memory, comparison, analysis, synthesis, abstraction, inference, and transfer. Metacognitive regulation concerns planning, monitoring, error detection, strategy selection, and reflection. Learner agency refers to the willingness and capacity to formulate a goal, sustain effort, make responsible choices, seek help, and evaluate one's own progress. This multidimensional definition prevents intelligence from being treated as a single static score. It also makes intellectual development pedagogically observable through the quality of reasoning, the independence of action, the flexibility of strategy use, and the ability to explain how a conclusion was reached.

The study addresses three related questions. First, which principles distinguish evidence-informed individualization from intuitive or label-based differentiation? Second, how can diagnosis, task design, scaffolding, feedback, and reflection be organized as a continuous classroom cycle? Third, which observable indicators can guide the selection of pedagogical support at different developmental levels? The purpose is therefore to construct a conceptually grounded and practically feasible model for the intellectual development of primary school students through an individualized pedagogical approach.

MATERIALS AND METHODS

The study employed a theoretical-analytical research design. Its source corpus combined foundational works on cognitive development and instruction with contemporary research syntheses concerning differentiated teaching, formative assessment, cognitive load, learning strategies, and self-regulation. The sources were selected according to four criteria: direct relevance to primary-age learning, explanatory value for individual differences, applicability to classroom decision-making, and methodological authority. The study did not involve an experimental sample and does not report statistical effects generated by the author; its results are a conceptual synthesis and pedagogical model.

The analysis proceeded through four procedures. First, the concept of intellectual development was decomposed into observable cognitive, metacognitive, and motivational components. Second, recurrent instructional mechanisms were identified across the literature: diagnostic assessment, calibrated challenge, scaffolding, guided practice, feedback, retrieval, reflection, and transfer. Third, these mechanisms were compared according to their function in the learning process and arranged as an adaptive sequence. Fourth, a matrix of developmental levels was constructed by relating learner indicators to corresponding teacher actions. The model was evaluated against four design criteria: developmental validity, instructional feasibility in a whole-class setting, avoidance of fixed labels, and preservation of common curricular standards.

The term individualization is used here in a specific sense. It denotes responsive adjustment based on current evidence of learning, not a claim that each child possesses an unchanging instructional type. Learning objectives remain common where curriculum standards require common outcomes; variation concerns the entry point, complexity, amount of guidance, time allocation, representational support, and mode of demonstrating understanding. This distinction was necessary because the educational use of presumed learning styles is not supported by the type of interaction evidence required to justify matching each learner to a preferred sensory mode [6].

RESULTS

Intellectual development as a multidimensional construct. The conceptual analysis showed that an individualized approach becomes coherent only when intellectual development is described through interdependent dimensions rather than isolated skills. The first dimension is cognitive processing: the learner identifies relevant information, maintains attention, retrieves prior knowledge, compares objects or propositions, detects relations, produces inferences, and transfers a rule to a modified context. The revised taxonomy of educational objectives is useful here because it distinguishes remembering and understanding from applying, analyzing, evaluating, and creating [7]. Individualization should therefore not merely alter the number of exercises; it should regulate the intellectual demand of the activity and provide a path from lower-complexity operations toward higher-order reasoning.

The second dimension is metacognitive regulation. A learner may possess the knowledge required for a task but fail to plan, monitor, or revise the process of solving it. Intellectual development is visible when pupils increasingly ask themselves what the task requires, which strategy is appropriate, whether an answer is plausible, and what should be changed after an error. The third dimension is motivation and agency. Sustained intellectual activity requires curiosity, perceived competence, persistence, and a degree of choice. Sternberg's work on the plurality of analytical, creative, and practical intellectual functions is relevant not because it justifies rigid learner types, but because it emphasizes that successful performance depends on coordinating different modes of thinking according to the demands of a situation [8].

The adaptive cycle of individualized instruction. The main result of the synthesis is a six-stage adaptive cycle presented in Figure 1. The cycle begins with a diagnostic profile based on observable evidence: prior knowledge, typical misconceptions, strategy use, pace, independence, language demands, and motivational response. The profile is provisional and task-specific. It should be updated as the learner changes rather than preserved as a permanent description. The second stage converts diagnostic information into a limited individual learning goal. A useful goal specifies the next attainable intellectual action, such as explaining a comparison criterion, selecting an operation independently, justifying an inference with evidence, or checking the completeness of a solution.

The third stage is adaptive task design. The teacher preserves the core concept but varies one or more parameters: the number of elements to coordinate, the degree of abstraction, the amount of irrelevant information, the required explanation, the type of representation, or the novelty of the context. This variation must be calibrated. Tasks that are too easy produce routine completion without development; tasks that exceed the learner's available resources create unproductive overload. Cognitive load theory is therefore important for individualization: instructional support should reduce extraneous processing while preserving the germane effort required to construct and reorganize knowledge [9].

The fourth stage involves scaffolding and guided practice. Support may take the form of a worked example, a visual organizer, a partially completed solution, a sequence of prompts, peer explanation, teacher modeling, or a checklist for self-monitoring. The defining feature of scaffolding is its temporary character. Assistance should be reduced as soon as the learner can perform the intellectual action with greater independence. The fifth stage collects formative evidence during the activity rather than after instruction has ended. Questions, short written explanations, observation of strategy use, error analysis, and exit tasks allow the teacher to identify the gap between the intended goal and the learner's current performance. Formative assessment is

effective when evidence is used to adapt teaching and when feedback helps the learner understand the goal, current position, and next step [10].

The sixth stage consists of reflection, transfer, and revision of the profile. The learner explains which strategy was used, why it was effective or ineffective, and where the same principle might apply. Transfer tasks are essential because correct performance in a familiar exercise does not necessarily indicate conceptual understanding. Reflection also supports self-regulated learning by shifting part of the regulatory function from the teacher to the pupil [11]. The new evidence then returns to the diagnostic stage, producing a continuous cycle rather than a one-time classification.

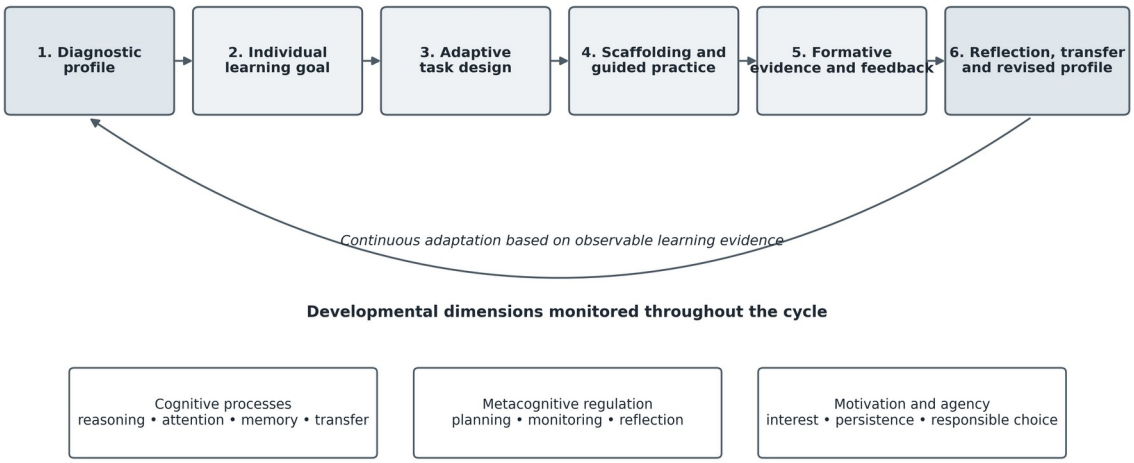


Figure 1. Adaptive cycle of individualized intellectual development in primary education

Developmental levels and pedagogical responses. The model differentiates four analytic levels: emerging, developing, proficient, and advanced. These levels are not grades, diagnoses, or stable identities. They describe the quality of performance in relation to a specific intellectual action and may differ across subjects or tasks. A pupil can demonstrate advanced classification in natural science but require developing-level support in mathematical problem representation. Table 1 summarizes observable indicators and pedagogical responses.

Table 1. Analytic levels of intellectual development and corresponding pedagogical responses

Level	Observable indicators	Typical learner need	Pedagogical response
Emerging	Identifies isolated details; depends on direct prompts; uses a strategy inconsistently; explanation is absent or fragmentary.	Orientation to the goal, relevant information, and first action.	Model the process; reduce extraneous information; use concrete representation, a worked example, and short prompt sequences.

Level	Observable indicators	Typical learner need	Pedagogical response
Developing	Completes familiar operations with partial independence; makes predictable errors; explains a rule after prompting.	Stabilization of a strategy and explicit monitoring of its steps.	Use partially completed tasks, comparison questions, guided error analysis, and immediate opportunities to revise.
Proficient	Selects an appropriate strategy independently; justifies a conclusion; checks work; transfers knowledge to a moderately changed context.	Greater novelty, conceptual connection, and reflective explanation.	Increase task variability; ask for alternative methods, evidence-based justification, and transfer to unfamiliar examples.
Advanced	Coordinates several relations; generates hypotheses; evaluates strategies; constructs original examples or questions; supports peers reflectively.	Depth, generalization, creativity, and responsible intellectual leadership.	Use open problems, counterexamples, multi-solution tasks, independent inquiry, and enrichment that deepens rather than repeats content.

The table clarifies that progress is not defined only by speed or the quantity of correct answers. At the emerging level, the central need is orientation: the learner must recognize the purpose, relevant information, and initial action. At the developing level, performance is partially successful but inconsistent; prompts are used to stabilize a strategy and make its steps explicit. At the proficient level, the teacher increases novelty and requires explanation, comparison of strategies, and transfer. At the advanced level, enrichment should deepen conceptual relations rather than simply increase workload. Open problems, counterexamples, multiple-solution tasks, peer tutoring with reflection, and the design of original questions are more developmentally valuable than repetitive acceleration.

Conditions for classroom implementation. The analysis identified seven conditions that make individualization feasible and educationally responsible. The first is dynamic diagnosis. A diagnostic profile should be constructed from several sources rather than a single test score. The second is a common intellectual core: all learners should engage with the same central concept or problem wherever possible, while support and complexity are varied. The third is flexible grouping. Groups are formed for a temporary purpose and reorganized when the purpose changes; this prevents status hierarchies from becoming permanent.

The fourth condition is evidence-informed variation. Teachers may vary examples, representations, question sequences, time, or response formats, but these decisions should follow from observed barriers. Variation should not be based on unsupported assumptions about fixed visual, auditory, or kinesthetic learning types [6]. The fifth condition is explicit strategy instruction. Research on learning techniques shows that retrieval practice and distributed practice possess broader utility than many familiar but less effective habits such as passive rereading or

indiscriminate highlighting [12]. In primary education, these principles can be implemented through low-stakes recall, cumulative questioning, brief delayed review, and opportunities to reconstruct a method from memory.

The sixth condition is feedback that preserves agency. Feedback should address the task, process, and next action rather than define the learner as intelligent or weak. It is most useful when concise, timely, and connected to an opportunity for revision. The seventh condition is gradual transfer of responsibility. Initial teacher explanation and modeling remain important; individualization is not equivalent to leaving each pupil to discover everything independently. Research syntheses on teaching effectiveness consistently emphasize clear goals, structured explanation, guided practice, checks for understanding, and progressive movement toward independent work [13–14].

The model can be implemented within ordinary subject lessons. In reading, all pupils may work with the same narrative, while some receive a sequence of inference prompts, others compare alternative interpretations, and advanced learners evaluate the reliability of a narrator or reconstruct the text from a changed perspective. In mathematics, the common concept may be multiplication, but learners can differ in the representational bridge used, the number of steps, the presence of worked examples, and the requirement to justify or generalize a rule. In natural science, the same phenomenon can be approached through observation, classification, causal explanation, or the design of a simple investigation. The central principle is that adaptation changes access to intellectual activity without reducing the learner's right to meaningful challenge.

A practical lesson architecture follows from the model. A short whole-class opening establishes the concept and success criteria. A diagnostic question then reveals current understanding. Learners move into flexible tasks with different levels of scaffolding; the teacher conducts targeted conferences or guided groups. A common discussion reconnects the variants to the shared concept, and a final transfer task provides evidence for the next cycle. This architecture protects classroom coherence while allowing focused support. It also aligns individual development with the broader educational goal of enabling learners to use knowledge independently, responsibly, and creatively in unfamiliar situations [15].

DISCUSSION

The proposed model reframes the individual approach as a system of responsive instructional decisions rather than a collection of isolated accommodations. Its central theoretical alignment is with the idea that development occurs when learners participate in activity that exceeds unaided performance but becomes accessible through mediated support [1]. However, the model also adds an operational requirement: support must be connected to evidence and systematically withdrawn. Without this requirement, scaffolding can become chronic assistance that produces dependency rather than development.

The model is also consistent with research on differentiated instruction. The meta-analytic evidence reviewed by Deunk and colleagues suggests that differentiation is not automatically effective simply because tasks differ; positive effects depend on the quality of implementation and the broader instructional context [5]. This conclusion explains why simplified practices, such as giving additional worksheets to high achievers or permanently separating low achievers, often fail to produce intellectual growth. Quantity is not equivalent to cognitive quality, and grouping is not equivalent to adaptation. The decisive issue is whether the learner encounters an appropriately

demanding intellectual action, receives the minimum necessary support, and is then required to perform with increasing independence.

A second contribution is the distinction between individual differences and fixed learner categories. Primary school children change rapidly, and their performance is highly sensitive to prior teaching, task wording, language, emotional security, and familiarity with the context. A profile that is useful for one lesson can become inaccurate after successful instruction. Treating a temporary difficulty as a stable trait may lower expectations and narrow access to complex tasks. The use of learning-style labels is particularly problematic because preference is not equivalent to an instructional mechanism, and the required evidence for matching methods to styles has not been established [6]. Multimodal representation remains useful when it clarifies structure or reduces unnecessary load, but it should be selected according to the content and cognitive purpose, not a presumed sensory identity.

The model has practical limitations. Dynamic assessment and flexible task design require strong teacher subject knowledge, an understanding of developmental progressions, and manageable class routines. Excessive customization can fragment planning and obscure common curricular goals. For this reason, the model recommends a limited repertoire of reusable adaptations: worked examples, prompt ladders, visual organizers, optional challenge layers, response choices, flexible time, and structured peer explanation. These tools can be prepared at the level of a unit rather than invented separately for each child and each lesson.

Another limitation concerns the nature of the present study. The model is theoretical and requires empirical validation in diverse primary classrooms. Future research should examine whether the adaptive cycle improves transfer, metacognitive independence, and the quality of reasoning rather than only immediate achievement. Studies should also compare implementation under different class sizes and teacher experience levels, identify which diagnostic indicators are most predictive of appropriate support, and investigate the point at which assistance should be faded. Such research would convert the conceptual framework into a tested instructional protocol.

CONCLUSION

The intellectual development of primary school students cannot be reduced to the accumulation of subject knowledge or to a fixed measurement of ability. It is a developmental process in which cognitive operations, metacognitive regulation, and learner agency become more differentiated, coordinated, and independent. An individualized pedagogical approach contributes to this process when it uses current learning evidence to adjust the degree of challenge and support while preserving shared educational goals.

The study developed a six-stage adaptive cycle: diagnostic profiling, individual goal setting, adaptive task design, scaffolding and guided practice, formative evidence and feedback, and reflection with transfer and profile revision. It also specified four developmental levels and corresponding pedagogical responses. The model rejects permanent ability labels and unsupported learning-style matching. Instead, it treats individual differences as dynamic information for making temporary instructional decisions.

For classroom practice, the most important implication is organizational coherence. Effective individualization does not require a separate curriculum for every pupil. It requires a common conceptual core, flexible grouping, calibrated tasks, explicit strategy instruction, timely feedback, and gradual transfer of responsibility. When these elements operate as a continuous system, individual support and collective learning cease to be opposing principles. They become

complementary conditions for enabling every learner to engage in meaningful intellectual activity and advance toward independent, critical, and transferable thinking.

DECLARATIONS

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A METHODOLOGY FOR IMPROVING THE EFFECTIVENESS OF STUDENTS' INDEPENDENT LEARNING IN THE TEACHING OF BIOPHYSICS

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Abstract. *This article develops a methodology for improving the effectiveness of medical students' independent learning in biophysics within a digitally transformed educational environment. The methodology links diagnostic assessment, differentiated learning trajectories, virtual laboratory work, clinically oriented biophysical cases, learning-management-system monitoring, electronic portfolios, peer review, and structured reflection. Independent learning is treated not as unsupervised completion of homework, but as a regulated cycle in which students set goals, select resources, test hypotheses, produce digital evidence, analyse errors, and revise their learning strategy. A quasi-experimental pretest–posttest design is described for an experimental group of 60 students and a control group of 45 students. Three criteria are assessed: motivational/self-regulatory, cognitive-analytical, and operational-reflective performance. For demonstration of the statistical procedure, explicitly simulated frequency data were coded on a three-level rubric (high = 5, medium = 4, low = 3). Baseline differences were negligible (all $p \geq .896$). At posttest, experimental-group means were higher across all criteria (Welch $t = 3.45–4.00$; $p \leq .001$; Cohen $d = 0.68–0.79$). The illustrative pattern suggests how adaptive tasks, digital experimentation, feedback, and portfolio-based reflection may be evaluated as a coherent pedagogical system. Because the dataset is simulated, the numerical findings are methodological examples and must be replaced with verified participant-level observations before empirical publication.*

Keywords: *independent learning; medical education; biophysics; self-regulated learning; virtual laboratory; electronic portfolio; adaptive learning; future physicians.*

1. INTRODUCTION

The expansion of medical knowledge and the rapid renewal of diagnostic technologies make independent learning a core condition of professional readiness. Future physicians must continue learning beyond scheduled classes, evaluate unfamiliar evidence, update conceptual models, and select appropriate digital resources. In foundational disciplines, however, independent work is often reduced to reading, note-taking, or completion of uniform exercises. Such tasks may increase workload without developing the learner's ability to plan, monitor, evaluate, and improve learning.

Biophysics offers a productive context for redesigning independent learning. Its topics—membrane transport, bioelectricity, haemodynamics, acoustics, optics, thermoregulation, radiation physics, and medical imaging—require students to coordinate conceptual knowledge, mathematical representation, experimental evidence, and clinical interpretation. Virtual laboratories and interactive simulations allow a learner to vary parameters, repeat an experiment, visualize a process, and compare predicted and observed outcomes. Yet access to a simulation does not itself ensure learning: students need a structured task, criteria for success, timely feedback, and an obligation to explain what the result means.

Self-regulated learning theory describes effective independent activity as a cyclical process of forethought, performance, monitoring, and reflection [1,2]. Research on formative feedback similarly emphasizes that learners improve when they understand the goal, compare present

performance with a standard, and identify a feasible next step [3]. In digital learning, flexibility can benefit achievement, but only when students possess time-management, metacognitive, and help-seeking strategies [4]. Multimedia and simulation resources must also be designed in accordance with cognitive principles so that interaction supports understanding rather than adding extraneous load [5,6].

The dissertation material used for this article identifies several practical difficulties: students may depend on teacher instructions, use digital resources as sources of ready-made answers, submit results without analysing measurement error, and struggle to connect a graph or model with a clinical-physiological process. These difficulties show that the central methodological task is not merely to increase the volume of independent assignments. It is to create a managed environment in which independence grows gradually and becomes visible through products, decisions, and reflection.

The purpose of the study is to substantiate a staged methodology for improving the effectiveness of students' independent learning in biophysics and to demonstrate an assessment strategy for its outcomes. The research questions are: (1) Which pedagogical conditions transform independent work into self-regulated learning? (2) How should digital resources, clinical-biophysical cases, monitoring, and feedback be integrated? (3) Which indicators can capture motivational, cognitive, operational, and reflective change?

2. METHODOLOGICAL FRAMEWORK

Independent learning is defined as purposeful student activity in which the learner accepts responsibility for planning, carrying out, monitoring, and evaluating a learning task while receiving appropriately calibrated pedagogical support. Independence therefore does not mean teacher absence. At early stages, the teacher diagnoses readiness, models strategies, provides scaffolds, and clarifies evaluation criteria; as competence grows, responsibility for selecting resources, regulating time, testing decisions, and correcting errors is transferred to the student.

The methodology is organized around the principle 'diagnosis – trajectory – activity – digital product – reflection – correction'. Diagnosis combines a short pretest, a digital-literacy questionnaire, and a clinical-biophysical prompt. On this basis, tasks are differentiated into foundational, applied, and interpretive levels. Students then work with concise multimedia explanations, digital texts, simulations, and virtual laboratories. The activity culminates in an observable product: a virtual experiment protocol, graph, concept map, short explanatory video, or clinical-biophysical case analysis.

An electronic portfolio connects separate assignments into a developmental record. Each portfolio contains an initial self-assessment and goal, digital products, feedback, revised work, error analyses, and a final reflective statement. LMS data—submission time, resource use, completion patterns, and repeated attempts—are used diagnostically rather than as direct evidence of competence. A high login frequency does not necessarily indicate meaningful learning; the decisive evidence is the quality of the student's explanation, data interpretation, revision, and transfer to a new clinical context.

The proposed teaching routine combines two complementary authorial methods. The Clinical Virtual Laboratory routine begins with a clinically meaningful physical problem, requires a prediction, guides parameter manipulation, and ends with graph-based interpretation and a defended clinical conclusion. The Adaptive Portfolio Monitoring routine structures independent work through differentiated tasks, electronic products, peer review, metacognitive questions,

teacher feedback, and corrective assignments. Together, the routines link classroom preparation with independent activity and ensure that digital work produces assessable evidence.

Three conditions support effectiveness. First, every task must align the biophysical concept, digital instrument, expected product, and assessment criterion. Second, scaffolding must be gradually reduced: students move from guided execution to semi-independent inquiry and finally to independent-creative work. Third, feedback must initiate revision rather than merely justify a mark. This design operationalizes self-regulation and avoids the misconception that independent learning is simply content studied outside the classroom.

Table 1. Staged methodology for independent learning in medical biophysics

Phase	Student activity and pedagogical support	Digital product and evidence
Diagnostic-planning	Pretest, self-assessment, goal setting, differentiated task selection, and explicit criteria	Individual goal and selected learning trajectory
Independent digital activity	Multimedia study, virtual experiment, clinical-biophysical case, data visualization, and peer interaction	Protocol, graph, concept map, short explanation, or cas analysis
Reflective-result	Self-assessment, peer review, teacher feedback, error analysis, revision, and portfolio defence	Revised product, reflective report, and next-step learnin plan

3. MATERIALS AND METHODS

Design and participants. A quasi-experimental pretest–posttest design was specified with an experimental group (n = 60) and a control group (n = 45). The experimental group followed the digitally supported independent-learning methodology, whereas the control group completed the established programme of readings, conventional homework, laboratory exercises, and routine teacher assessment. Welch's independent-samples t-test was used because group sizes were unequal. In a real implementation, the institution, course level, study duration, allocation procedure, participant characteristics, ethical permission, and informed-consent procedure must be reported; these details were not available and were not invented.

Intervention. The learning cycle included six stages: diagnostic entry assessment; selection of a differentiated trajectory; independent digital study; creation of a digital product; self-assessment and peer review; and portfolio defence with corrective feedback. Students used virtual laboratories, interactive simulations, short video explanations, digital texts, clinical-biophysical cases, electronic tests, and LMS prompts. Each task required a prediction, documented procedure, result visualization, identification of an error source, and a reasoned clinical-biophysical conclusion.

The Clinical Virtual Laboratory routine was applied to topics such as membrane potential, diffusion, blood-flow resistance, ultrasound, optics, and thermal exchange. Students first formulated a hypothesis and chose variables; they then performed a digital experiment, entered results into a table, generated a graph, and compared the pattern with a theoretical model. The Adaptive Portfolio Monitoring routine organized out-of-class learning: students selected a level-appropriate task, created evidence, received peer and teacher comments, revised the work, and described the strategy they would use in the next task.

Assessment. Four sources of evidence were triangulated: a biophysics knowledge test, a virtual laboratory protocol, a clinical-biophysical case, and a reflective electronic-portfolio entry. The motivational/self-regulatory criterion captured goal setting, persistence, time management, help seeking, and recognition of professional relevance. The cognitive-analytical criterion captured conceptual understanding, interpretation of parameters and graphs, and transfer to clinical physiology. The operational-reflective criterion captured independent use of digital tools, quality

of the generated product, error analysis, response to feedback, and justification of revision. Performance was categorized as high (5), medium (4), or low (3).

Statistical strategy and simulation. Only the two group sizes were available for this manuscript; no participant-level dataset was supplied. Plausible integer frequencies were therefore constructed solely to demonstrate the analysis. The simulated baseline distributions were kept similar, while posttest distributions reflected the expected methodological pattern: fewer low-level performances and more medium/high performances in the experimental group. Means and standard deviations were calculated from scores 5–4–3. Welch's t-test compared group means, Pearson's chi-square test compared categorical distributions, and Cohen's d summarized standardized magnitude. Two-sided $\alpha = .05$ was used. The resulting p-values describe separation within the constructed dataset, not evidence about a real population.

4. RESULTS

Baseline comparability. In the simulated pretest, high-level performance in the experimental group was 8.3% across all three criteria, medium performance was 20.0%–21.7%, and low performance was 70.0%–71.7%. In the control group, high performance was 8.9%, medium performance was 20.0%–22.2%, and low performance was 68.9%–71.1%. Mean differences did not exceed 0.02 points. Welch tests indicated no baseline group difference for motivational/self-regulatory and operational-reflective performance, $t = -0.09$, $p = .931$, or cognitive-analytical performance, $t = -0.13$, $p = .896$.

Posttest distribution. The simulated experimental group shifted substantially toward the medium and high levels. For motivational/self-regulatory performance, 25.0% reached the high level and 51.7% the medium level, compared with 11.1% and 24.4% in the control group. For cognitive-analytical performance, experimental-group proportions were 21.7% high and 53.3% medium, compared with 11.1% and 24.4% in the control group. For operational-reflective performance, the experimental group reached 23.3% high and 50.0% medium, whereas the control group reached 11.1% high and 26.7% medium. Low-level performance remained above 62% in the control group but fell to 23.3%–26.7% in the experimental group.

Table 2. Illustrative pretest and posttest independent-learning distributions, n (%)

Criterion	Time	Group	n	High	Medium	Low
Motivational/self-regulatory	Pre	Experimental	60	5 (8.3)	12 (20.0)	43 (71.7)
Motivational/self-regulatory	Pre	Control	45	4 (8.9)	9 (20.0)	32 (71.1)
Motivational/self-regulatory	Post	Experimental	60	15 (25.0)	31 (51.7)	14 (23.3)
Motivational/self-regulatory	Post	Control	45	5 (11.1)	11 (24.4)	29 (64.4)
Cognitive-analytical	Pre	Experimental	60	5 (8.3)	13 (21.7)	42 (70.0)
Cognitive-analytical	Pre	Control	45	4 (8.9)	10 (22.2)	31 (68.9)
Cognitive-analytical	Post	Experimental	60	13 (21.7)	32 (53.3)	15 (25.0)
Cognitive-analytical	Post	Control	45	5 (11.1)	11 (24.4)	29 (64.4)
Operational-reflective	Pre	Experimental	60	5 (8.3)	12 (20.0)	43 (71.7)
Operational-reflective	Pre	Control	45	4 (8.9)	9 (20.0)	32 (71.1)
Operational-reflective	Post	Experimental	60	14 (23.3)	30 (50.0)	16 (26.7)
Operational-reflective	Post	Control	45	5 (11.1)	12 (26.7)	28 (62.2)

Note. *High, medium, and low levels were coded as 5, 4, and 3 for mean-based analyses. All frequencies are simulated for methodological illustration.*

The combined proportion at medium or high level reached 76.7% in the experimental group versus 35.6% in the control group for motivational/self-regulatory performance. The

corresponding proportions were 75.0% versus 35.6% for cognitive-analytical performance and 73.3% versus 37.8% for operational-reflective performance. The pattern is methodologically meaningful because self-regulation, conceptual interpretation, and reflective digital action were addressed through connected tasks rather than isolated interventions.

4. RESULTS (CONTINUED)

Mean-score analysis. At posttest, experimental-group means were 4.02 (SD = 0.70) for motivational/self-regulatory performance, 3.97 (SD = 0.69) for cognitive-analytical performance, and 3.97 (SD = 0.71) for operational-reflective performance. Control-group means were 3.47 (SD = 0.69), 3.47 (SD = 0.69), and 3.49 (SD = 0.69), respectively. The illustrative between-group advantage therefore ranged from 0.48 to 0.55 points.

Table 3. Illustrative between-group statistical comparisons

Criterion	Pre E	Pre C	p	Post E	Post C	Welch t	p	Cohe
Motivational/self-regulatory	3.37	3.38	0.931	4.02	3.47	4.00	<.001	0.79
Cognitive-analytical	3.38	3.40	0.896	3.97	3.47	3.67	<.001	0.72
Operational-reflective	3.37	3.38	0.931	3.97	3.49	3.45	<.001	0.68

Note. *E = experimental group; C = control group. Welch degrees of freedom vary slightly by criterion. Data are simulated.*

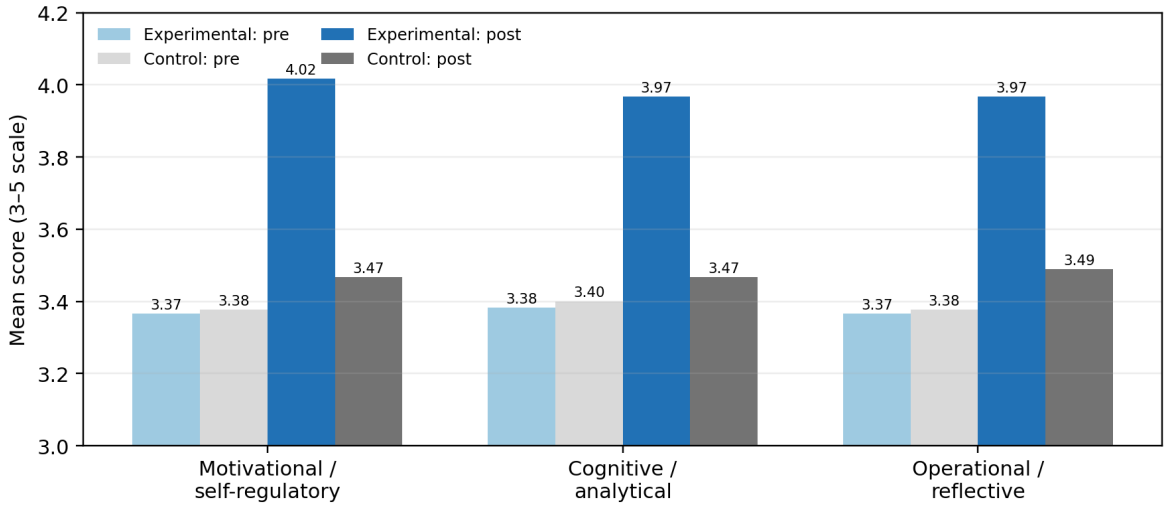


Figure 1. Mean independent-learning scores by group and measurement occasion (illustrative simulated data).

Inferential pattern. The simulated posttest difference was t = 4.00, p < .001, d = 0.79 for motivational/self-regulatory performance; t = 3.67, p < .001, d = 0.72 for cognitive-analytical performance; and t = 3.45, p = .001, d = 0.68 for operational-reflective performance. Pearson chi-square comparisons of posttest levels yielded $\chi^2(2) = 17.98$, p < .001; $\chi^2(2) = 16.46$, p < .001; and $\chi^2(2) = 13.38$, p = .001, respectively. These moderate-to-large standardized differences illustrate the expected direction of change, but they cannot confirm effectiveness without authentic data.

5. DISCUSSION

The methodology reframes independent learning as a designed, monitored, and reflective process. Its central contribution is the alignment of five elements that are often separated: a clinically meaningful biophysical problem, a digital learning action, an observable product, criterion-based feedback, and revision. This alignment makes independence assessable. Students do not merely report that they studied; they demonstrate how they formulated a question, manipulated evidence, interpreted a result, corrected an error, and transferred the explanation to a clinical context.

Gradual transfer of responsibility is essential. Students with limited experience may need explicit models, checklists, worked examples, and teacher prompts. Removing support too early

can turn flexibility into confusion, while keeping support constant can preserve dependence. The six-stage cycle therefore begins with diagnosis and differentiation, moves through guided and semi-independent activity, and ends with portfolio defence. This structure corresponds to cyclical models of self-regulation in which planning, performance control, self-observation, and reflection influence the next learning episode [1,2].

The illustrative results demonstrate how the method could influence complementary dimensions. The largest simulated effect was motivational/self-regulatory performance, consistent with the expectation that choice, visible progress, and professional relevance strengthen engagement. Cognitive-analytical change reflects repeated interpretation of models and clinical-biophysical cases. Operational-reflective change reflects students' ability to produce digital evidence, identify error, use feedback, and revise. These outcomes are mutually reinforcing: better monitoring helps students detect conceptual gaps, while stronger conceptual knowledge improves the quality of digital decisions.

Several practical rules follow. A virtual laboratory protocol should require prediction, parameter justification, a graph, error analysis, and a clinical conclusion. Adaptive tasks should differ in cognitive demand, not merely in length. Portfolio assessment should reward revision and reasoning rather than visual decoration. Peer review should use a short rubric and require the reviewer to identify one strength, one evidence-based concern, and one actionable next step. LMS analytics should trigger support for delayed or repeated failure, but should never replace direct evaluation of the student's work. Digital safety, source attribution, and responsible use of physiological or clinical data must be embedded in routine tasks.

For empirical evaluation, the rubric should undergo expert content review and pilot testing. Raters should use anchor examples, and inter-rater agreement should be reported for protocols, cases, and reflective entries. If the same students complete both measurements, a paired or multilevel analysis is preferable to treating observations as independent; ANCOVA can compare posttest outcomes while adjusting for baseline. Qualitative analysis of portfolio revisions can complement scores by showing how students' strategies and explanations change over time.

Limitations. The numerical results are simulated and cannot establish causation, generalizability, or actual educational effectiveness. Participant characteristics, implementation fidelity, missing data, instrument reliability, and ethical procedures were not available. The present article should therefore be used as a conceptual and methodological prototype. Before submission as an empirical study, all simulated values must be replaced with verified observations and the methods section must report the educational setting, intervention duration, allocation, ethics, validation, and reproducible analysis.

6. CONCLUSION AND PRACTICAL RECOMMENDATIONS

Effective independent learning in medical biophysics emerges when student autonomy is supported by clear goals, differentiated trajectories, purposeful digital tools, visible products, feedback, and reflection. The proposed methodology integrates diagnostic assessment, virtual laboratory inquiry, clinical-biophysical cases, adaptive assignments, electronic portfolios, peer review, and corrective monitoring. It connects motivation and self-regulation with conceptual interpretation and operational-reflective competence.

Medical schools should align every independent task with a competency and an assessment criterion; require interpretation rather than simple digital completion; organize gradual movement from guided to independent-creative work; document progress through electronic portfolios; use LMS indicators to target support; and make revision a required response to feedback. Teachers

need methodological preparation in digital modelling, adaptive task design, portfolio assessment, and facilitation of reflective dialogue.

Future research should use validated instruments and authentic participant-level data to test achievement, retention, transfer to clinical cases, self-regulation, and the durability of independent-learning strategies. Mixed-method designs can reveal not only whether scores change, but how learners plan, monitor, seek help, interpret failure, and revise their work. Such evidence would clarify which elements of the methodology are most effective across different biophysics topics and student populations.

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INTEGRATING PARTICIPATION, TRANSPARENCY, AND ACCOUNTABILITY IN SCHOOL GOVERNANCE: A CONCEPTUAL MODEL FOR PUBLIC OVERSIGHT IN UZBEKISTAN

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Abstract. *Public oversight in schools is often reduced to isolated acts of disclosure, consultation, or reporting. This conceptual study develops a more integrated account of how participation, transparency, and accountability can function together in general secondary school governance, with particular reference to Uzbekistan. The analysis uses a structured conceptual synthesis of Uzbekistan's legal framework, international guidance on citizen and adolescent participation, and established scholarship on transparency and accountability. It argues that the three principles are mutually dependent: participation contributes stakeholder knowledge and experience; transparency converts information into a shared and verifiable basis for deliberation; and accountability connects decisions to reasons, responsible actors, deadlines, implementation, and results. On this basis, the article proposes a six-stage public oversight cycle—signal, disclosure, deliberation, decision, implementation, and reassessment—and translates the cycle into practical mechanisms for schools, including stakeholder mapping, concise information packages, hybrid participation channels, decision registers, and outcome-oriented monitoring. The article also identifies safeguards against tokenism, capture by active minorities, information overload, privacy breaches, and blame-oriented accountability. The model offers a context-sensitive framework for strengthening school-level public oversight while preserving professional and statutory authority and provides testable propositions for future empirical research. Its central contribution is to recast public oversight as a recurring learning process rather than a one-time compliance activity.*

Keywords: *public oversight, participation, transparency, accountability, school governance, Uzbekistan*

Introduction

Public oversight in education is often described through visible activities: publishing information, presenting a principal's report, surveying parents, or holding a council meeting. Such activities may be useful, but they do not by themselves show that oversight is meaningful. A school can disclose information stakeholders cannot interpret, invite participation after a decision is effectively settled, or report activities without showing whether the underlying problem improved. The central governance issue is therefore the quality of the relationship these practices create between stakeholders and authorized decision makers.

This issue is especially important in general secondary schools because governance combines different forms of knowledge and responsibility. Students directly experience the learning environment, safety, peer relations, and school climate. Parents see how policies affect

families. Teachers contribute professional and pedagogical knowledge, while school leaders carry managerial and legal responsibility. Local institutions may provide resources, social support, protection, or coordination. Public oversight can strengthen governance when these perspectives are connected to evidence and decisions, but it can become symbolic or burdensome when that connection is weak.

The distinction between participation as presence and participation as influence is well established. Arnstein (1969) warned that participatory arrangements can remain tokenistic when institutions collect voice without allowing practical influence. Fung (2006) later showed that participatory mechanisms vary according to who participates, how participants communicate, and how their contributions are connected to public action. These insights are directly relevant to schools: counting meetings, survey responses, or council members is less informative than asking whether the process included the right people, provided usable information, and created a credible path from input to decision.

This article develops a conceptual model in which participation, transparency, and accountability operate as interdependent principles of one public oversight cycle. It clarifies the function of each principle, connects the model to Uzbekistan's legal context, translates the principles into school-level mechanisms and indicators, and identifies safeguards against common risks. The central argument is that oversight becomes development-oriented when stakeholder voice, usable information, legitimate authority, documented responsibility, and feedback are connected. Oversight is therefore treated as a recurring process of learning and response rather than an episodic act of control.

Analytical Approach and Legal Context

The article uses a structured, theory-building conceptual synthesis rather than an empirical design or systematic review. Sources were purposively selected for direct relevance to three areas: Uzbekistan's legal framework for participation, openness, oversight, and education; international guidance on citizen and adolescent participation; and established scholarship on transparency, accountability, and education governance. The aim is to construct an internally coherent model and specify mechanisms that can later be operationalized and tested empirically, not to estimate causal effects or report school-level outcomes.

Uzbekistan's legal framework provides an institutional basis for this analysis. The Constitution of the Republic of Uzbekistan (2023) establishes the general right of citizens to participate in public and state affairs. The Law of the Republic of Uzbekistan No. ZRU-474, On Public Oversight (2018), identifies appeals and inquiries, public discussion, hearings, monitoring, public examination, and study of public opinion. The Law of the Republic of Uzbekistan No. ZRU-369, On Openness of the Activities of State Authorities and Administration Bodies (2014), provides for access to information and openness, while the Law of the Republic of Uzbekistan No. ZRU-637, On Education (2020), establishes the broader framework for education governance, monitoring, and quality. These instruments create formal space for involvement but do not fully specify how school-level participation should be representative, information usable, or public input connected to implementation.

International governance literature helps define these design conditions. The World Bank's service-delivery framework emphasizes accountability relationships among citizens, policymakers, organizations, and frontline providers (World Bank, 2003). In education, Bruns et al. (2011) show that information, school-based management, and accountability reforms depend heavily on institutional design and implementation. The World Bank (2018) similarly emphasizes

measurement, evidence-based action, and alignment around learning outcomes, while UNESCO (2017) frames educational accountability as shared responsibility. Together, these approaches support public oversight as a complement to professional and statutory authority, not a substitute for it.

Participation: From Presence to Influence

Meaningful participation begins with the question of decision relevance. Stakeholders should be involved at a stage when their information, experience, or preferences can still affect the way a problem is understood or addressed. Attendance at a meeting, membership on a council, or completion of a survey is not sufficient if the issue has already been settled or if participants never learn what happened to their input. In this sense, participation is a governance function, not a ceremonial activity.

Participant selection should therefore be issue-specific. Student safety and school climate require student experience. Family-school cooperation requires parent perspectives. Instructional and methodological questions require teacher expertise. Neighborhood-level problems may require mahalla institutions, social services, health providers, or other local organizations. Representation should not be equated with numerical majority. A process may attract highly active parents while excluding families with limited time, internet access, language proficiency, disability accommodations, or confidence in dealing with institutions. Inclusive design requires identifying both who is affected and who is likely to be absent.

OECD (2022) guidance is useful because it treats participation as a sequence rather than a single event. It emphasizes defining the problem and expected results, selecting appropriate participants and methods, using the contributions received, providing feedback, and evaluating the process. Applied to schools, this means stating in advance what is genuinely open to influence, what is fixed by law or professional standards, what information participants need, and when a decision will be made. Clear boundaries reduce false expectations and consultation fatigue.

Student participation requires additional safeguards. UNICEF (2020) emphasizes that meaningful adolescent participation includes being informed, being heard, and having an opportunity to influence decisions affecting one's life. In schools, participation should use age-appropriate language, be voluntary and safe, protect students from retaliation or embarrassment, and produce visible feedback. Students should not assume responsibilities that belong to adults, but their direct knowledge of school climate, safety, inclusion, and learning conditions should not be reduced to ceremony. Quality is therefore better assessed through inclusiveness, informed engagement, relevance, and demonstrated influence than through participation counts.

Transparency: From Disclosure to Usable Evidence

Transparency is often treated as a publication requirement, yet disclosure and transparency are not identical. A school can publish many documents and remain difficult to understand if information is late, fragmented, technically obscure, or disconnected from the questions stakeholders are trying to answer. Effective transparency combines availability with comprehensibility, comparability, verifiability, and traceability. Stakeholders should be able to determine what a figure means, where it came from, what period it covers, how it compares with prior results, and how it was used in a decision.

This distinction matters because transparency does not automatically create accountability. Fox (2007) argues that the relationship depends on the quality of information and on the existence of institutions capable of responding to it. For schools, publication of attendance, learning, safety, or resource indicators is useful only when the data can be interpreted and when stakeholders know

what can be done with the information. Transparency should therefore be designed around decision needs rather than around document volume.

Contextualization is equally important. A single performance measure cannot represent the quality of a school. Attendance may be related to transport, health, family circumstances, or school climate. Learning outcomes may be affected by prior achievement, language, staffing, or assessment design. Complaints may increase because conditions deteriorated, but they may also increase because access to complaint channels improved. Transparent reporting should therefore explain definitions, trends, limitations, and relevant relationships among indicators.

Openness also has legal and ethical boundaries. Personal data, individual grades, sensitive information about minors, confidential personnel matters, and identifiable complaint details should not be disclosed simply in the name of transparency. The objective is lawful public visibility of matters affecting collective interests, not unrestricted exposure. Procedural transparency is equally important: stakeholders should know the purpose of consultation, the criteria used to compare options, who had authority to decide, when a decision was made, and why a proposal was accepted, modified, or rejected. These elements turn information into a shared evidentiary basis for deliberation.

Accountability: From Reporting to Answerability

Accountability connects authority to explanation, responsibility, and follow-through. Bovens (2007) defines accountability as a relationship in which an actor must explain and justify conduct to a forum that can question, evaluate, and potentially impose consequences. In schools, consequences do not need to be punitive. They may include correction of a plan, additional monitoring, escalation to a competent authority, revision of a procedure, or a public explanation of why a requested change cannot lawfully or practically be implemented. The essential condition is that responsibility and response are visible.

Educational accountability is relational rather than one-directional. UNESCO (2017) emphasizes shared responsibilities among governments, schools, teachers, parents, and other actors. A principal should be accountable for matters within managerial authority, but not for constraints controlled elsewhere. Blame-oriented accountability can weaken governance because it reduces complex problems to finding an individual culprit. Sound accountability instead specifies the problem, evidence, responsible actor, available authority, expected action, deadline, and outcome.

This logic is consistent with education reform literature. Bruns et al. (2011) review accountability-oriented reforms and show that information, school-based management, and incentives are most useful when responsibilities and information flows are well designed. The World Bank (2003) likewise distinguishes accountability relationships among citizens, policymakers, providers, and frontline professionals. For school-level public oversight, a concern should therefore be directed to an actor who has both the authority and resources to address it. Otherwise, participation creates frustration and transparency creates exposure without remedy.

A practical instrument is a decision and proposal register. Each substantive proposal can be assigned a date, source, review status, responsible actor, response deadline, decision rationale, implementation milestone, and outcome indicator. Rejected proposals should receive reasoned explanations; accepted proposals should remain visible until implementation is completed, revised, or formally closed. Such a register creates a documented chain from voice to action and makes follow-up possible without requiring constant informal escalation.

An Integrated Public Oversight Cycle

Participation, transparency, and accountability are analytically distinct but operationally dependent. Participation introduces experience, needs, and alternative perspectives. Transparency allows these claims to be examined against shared information and makes the reasoning of decision makers visible. Accountability turns decisions into assigned responsibilities and creates an obligation to report on implementation. When results are disclosed and stakeholders can reassess them, the process generates new information for subsequent decisions.

The proposed model organizes this relationship as a six-stage cycle: signal, disclosure, deliberation, decision, implementation, and reassessment. A signal may arise from monitoring data, a complaint, a survey, a student council, a parent group, staff observation, or a public discussion. Disclosure means assembling the minimum information required to understand the issue, including definitions, trends, limitations, legal constraints, and decision boundaries. Deliberation brings relevant groups into structured consideration of causes and options. Decision records the selected course of action and the reasons for it. Implementation identifies responsible actors, resources, milestones, and deadlines. Reassessment compares results with the original problem and determines whether further action is necessary.

The cycle prevents each principle from becoming a stand-alone ritual. Participation without disclosure can become opinion exchange without evidence; transparency without participation can become one-way publication; and accountability without either can become reporting disconnected from public concerns. OECD (2017) links public trust to governance quality and institutional responsiveness. Here, trust is treated not as an automatic result of communication but as a possible outcome of repeated cycles in which institutions explain what they know, what they can do, what they decided, and what happened. Consistency between information, decisions, and follow-through matters more than communication volume.

Operationalizing the Model in General Secondary Schools

A school-level oversight model must be rigorous enough to produce meaningful information but simple enough to repeat without creating excessive administrative burden. Five mechanisms are especially important.

First, stakeholder mapping should be undertaken for each substantive issue. The school identifies groups directly affected, groups with relevant professional or experiential knowledge, actors with decision authority, and partners able to contribute resources. The map should also identify groups likely to be underrepresented and select outreach methods accordingly.

Second, the school should prepare an issue-specific information package rather than distribute a large collection of documents. A concise package can explain the problem, available evidence, indicator definitions, trends, legal or budgetary constraints, and the decisions that are genuinely open to influence. Short interpretive notes should clarify what numerical indicators do and do not show.

Third, participation channels should be matched to purpose. Surveys identify broad patterns, focus groups explore experience, open meetings support deliberation, and representative councils sustain dialogue. No single channel is sufficient. Digital tools can widen access, but online-only systems may exclude stakeholders because of connectivity, digital literacy, disability, language, or confidence. Hybrid participation combining digital surveys, written submissions, meetings, and small-group discussion is more likely to reach diverse groups.

Fourth, the decision and proposal register should provide a visible chain from submission to response. For privacy-sensitive issues, public reporting can use anonymized or aggregated

descriptions. Fifth, scheduled feedback should report not only completed activities but also which proposals were accepted or rejected, why decisions changed or remained unchanged, what has been implemented, and what evidence will be considered during reassessment.

Evaluation should focus on quality and outcomes rather than activity counts. Participation indicators can include diversity, inclusion of affected groups, participant understanding, and influence of substantive proposals. Transparency indicators can include timeliness, completeness, clarity, accessibility, and verifiability. Accountability indicators can include response time, completion of commitments, quality of decision rationales, and follow-up on unresolved matters. Integrated indicators can include trends in the underlying problem, repeated complaints, stakeholder understanding of decisions, and trust patterns over time. These indicators should be interpreted as a balanced set rather than collapsed into a single score.

Table 1

Governance Requirements, Mechanisms, and Indicators in the Integrated Public Oversight Model

Principle	Governance requirement	Core mechanisms	Evaluation indicators
Participation	Relevant and diverse stakeholders can influence appropriate stages of a decision.	Stakeholder mapping; surveys; focus groups; open discussion; student and parent representation.	Representation and inclusion; informed participation; quality and influence of proposals.
Transparency	Decision-relevant information is timely, understandable, contextualized, and verifiable.	Issue-specific information package; indicator notes; meeting records; decision register.	Timeliness; completeness; accessibility; clarity; verifiability.
Accountability	Authority, rationale, responsibility, deadlines, and results are explicit.	Decision register; assigned responsible actor; reasoned responses; implementation tracking.	Response time; completion rate; quality of rationale; follow-up on unresolved matters.
Integrated feedback	Participation is connected to disclosure, decision, implementation, and reassessment.	Signal-disclosure-deliberation-decision-implementation-reassessment cycle.	Problem trends; repeated complaints; stakeholder understanding; trust patterns.

Note. The indicators are illustrative and should be adapted to the legal authority, resources, and context of individual schools.

Risks, Safeguards, and Conditions for Effectiveness

Public oversight can create unintended effects if participation and disclosure are assumed to be beneficial under all conditions. One risk is capture by an active minority that dominates discussion and creates an appearance of consensus. A second is tokenism, where opinions are collected without a clear path to influence. A third is information overload, where dense disclosure

reduces understanding. A fourth is privacy harm involving minors, individual performance, or sensitive complaints. A fifth is blame-oriented accountability, where complex problems are reduced to identifying someone to punish.

These risks require procedural safeguards. Participant selection should be transparent and supplemented by outreach to underrepresented groups. Consultation materials should distinguish negotiable issues from fixed legal or professional requirements. Moderation should limit intimidation and repeated domination. Indicators need definitions and contextual explanation. Privacy rules should specify what remains confidential and how complaints are anonymized. Accountability should distinguish explanation, correction, learning, and sanction so that oversight supports improvement rather than defensive behavior.

The model also depends on institutional capacity. Public oversight requires skills in facilitation, data communication, recordkeeping, privacy protection, and response management. Brief pedagogical and legal orientation can help participants understand both their rights and the limits of school-level authority. School leaders may need support to convert consultation results into reasoned and documented decisions. This is consistent with Fung's (2006) emphasis on institutional design and with Fox's (2007) argument that information alone is insufficient where response mechanisms are weak.

Discussion and Research Implications

The proposed model makes three contributions. First, it reframes participation, transparency, and accountability as parts of a common governance architecture rather than as separate compliance requirements. This matters because weaknesses in one principle can neutralize the others. More participation is not necessarily better if participants lack usable information; more disclosure is not necessarily better if no forum can act on it; and more reporting is not necessarily accountability if responsibility and consequences are unclear.

Second, the model translates broad governance principles into school-level routines that can be observed and evaluated. Stakeholder maps, information packages, hybrid participation channels, decision registers, and scheduled feedback provide concrete points at which implementation quality can be assessed. This makes the framework suitable for later empirical work rather than leaving it at the level of abstract principles.

Third, the model is designed to preserve legitimate professional and legal authority. Public oversight should not permit stakeholders to override statutory responsibilities, compromise student privacy, or replace professional judgment with popularity. Its function is to improve the quality of evidence, representation, explanation, responsiveness, and learning around decisions that schools and competent authorities are empowered to make.

Because this article is conceptual, the proposed relationships remain propositions rather than tested effects. Future research in Uzbekistan could compare participation channels, assess whether decision registers reduce repeated unresolved complaints, test stakeholder comprehension of disclosed information, and examine whether repeated feedback cycles are associated with trust, responsiveness, school climate, or implementation reliability. Research should also measure administrative costs. The central empirical question is not whether oversight activity increases, but whether the connection between voice, evidence, decision, implementation, and reassessment becomes more credible.

Conclusion

Effective public oversight in general secondary schools is not achieved by maximizing participation, disclosure, or reporting in isolation. It depends on connecting stakeholder voice to

usable information, legitimate decision authority, explicit responsibility, and repeated feedback. Participation contributes knowledge and representation; transparency creates a common evidentiary basis and makes decisions traceable; accountability requires explanation, assigned responsibility, and follow-through. When one element is weak, the practical value of the others declines.

For Uzbekistan, the existing legal framework provides a substantial basis for public participation, openness, and education governance. The implementation challenge is to translate those norms into school-level routines that are meaningful, proportionate, inclusive, and safe. The proposed signal-disclosure-deliberation-decision-implementation-reassessment cycle offers such a structure. Stakeholder mapping, concise information packages, hybrid participation channels, decision registers, scheduled feedback, and balanced indicators make the cycle observable and manageable.

The model is not a fixed template. Schools differ in size, resources, local relationships, and authority to address particular problems. Its contribution is architectural: it specifies how evidence, voice, authority, responsibility, and learning can be connected in a recurring process. That connection is where public oversight can move beyond formal compliance and become a practical mechanism for better school governance.

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DEVELOPMENT OF CORE SPIRITUAL COMPETENCIES IN FUTURE TEACHERS BASED ON AN AXIOLOGICAL APPROACH

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Abstract. *The development of openness, respect for others, law-abiding behavior, critical evaluation of social reality, tolerance, and responsibility among university students is closely connected with the quality of educational and upbringing practices in higher education. In teacher education, this problem is especially significant because future teachers are expected not only to master professional knowledge and pedagogical technologies, but also to internalize a stable system of spiritual and moral values that guides their professional judgments and conduct. This article examines the axiological foundations of developing core spiritual competencies in future teachers. The study is based on theoretical analysis, comparison, conceptual synthesis, and generalization of pedagogical, philosophical, and psychological literature. Particular attention is paid to the mechanisms through which social and cultural values become personal motives, ideals, needs, and goals of activity. A structural model of the development of students' spiritual values is presented, including need, interest, motive, purpose of activity, moral ideals, and internalization. The article also systematizes pedagogical games and training activities that can support value reflection, self-analysis, self-assessment, and conscious moral choice. It is concluded that an axiological approach can strengthen the unity of professional preparation and moral development when value-oriented content is combined with reflective and activity-based educational methods.*

Keywords: *axiology, values, competence, spiritual and moral potential, intellectual development, cultural values, spiritual values, self-awareness, internalization, self-education, moral ideals, future teachers.*

INTRODUCTION

Globalization and the rapid transformation of contemporary societies have increased the educational importance of forming young people who possess a developed spiritual and moral worldview, intellectual maturity, social responsibility, and a stable commitment to universal human values. Higher education is therefore expected to create pedagogical conditions that encourage social activity, responsible judgment, resistance to destructive ideological influences, and the capacity to evaluate complex social phenomena critically. For teacher education, these tasks are particularly important because the values internalized by future teachers later influence their professional decisions, interpersonal relations, classroom culture, and educational impact on pupils.

The development of a person's spirituality cannot be reduced to the accumulation of information about morality or culture. It requires a systematic transition from socially recognized values to personally accepted meanings, motives, ideals, and patterns of behavior. From this perspective, the axiological approach offers a conceptual framework for understanding how values

function in education and how pedagogical activity can support their conscious appropriation. The purpose of this article is to systematize the theoretical foundations and practical pedagogical mechanisms for developing core spiritual competencies in future teachers through an axiological approach.

LITERATURE REVIEW AND RESEARCH METHODOLOGY

Social norms, requirements, ideals, and cultural values are not absorbed by an individual mechanically. They are selected, interpreted, and appropriated in accordance with personal experience, motives, needs, and life goals. Consequently, an individual system of value relations may not always coincide completely with the hierarchy of values formally recognized by society. Social values become an effective stimulus for activity when they are consciously accepted, personally meaningful, and related to a person's ideals and goals.

The formation of the individual as a personality presupposes the assimilation of a system of humanistic values that constitutes the foundation of humanistic culture. Introducing these values into education has significant social importance. The humanization of education should therefore provide conditions for a conscious choice of cultural values and, on that basis, for the formation of a stable personal system of humane value relations. Value-oriented education affects the learner's behavioral orientation: worldview provides the conceptual context of value relations, norms perform a regulatory function, and value attitudes organize the meaning of activity and behavior.

Education may accordingly be understood as a socially organized process of internalizing universal human values. However, intellectual awareness of a value is not sufficient for it to become a real regulator of behavior. A value begins to function as a motive when it is internalized and incorporated into the person's inner world, when the individual can formulate the purpose of an activity, understand its humanistic meaning, select appropriate means for its implementation, exercise timely self-control, and evaluate or correct personal actions.

A value becomes an object of personal need when educational activity is deliberately organized in such a way that the learner encounters meaningful situations, makes choices, evaluates alternatives, and experiences the necessity of adopting a position. In this sense, the pedagogical process should not merely declare values; it should create conditions in which values are experienced, interpreted, and transformed into internal regulators of conduct.

Internalization is closely related to the transformation of socially shared meanings into higher psychological functions of the individual. It is also connected with exteriorization, that is, the creative transformation of the environment through activity. As students act, they encounter new objects, relationships, and problems that generate new needs. The dynamics of spiritual needs can therefore be understood only through the interaction of internal appropriation and outward activity.

The appropriation of universal values cannot be explained solely by cognition. Emotional experience also plays a substantial role. Socially significant values are accepted not only through rational interpretation but also through feelings that provide personal significance to a judgment or event. For this reason, value internalization requires the unity of cognitive and emotional processes, rational understanding and readiness for action, as well as the interaction of social requirements with the individuality of the learner.

The concepts of axiology and value are interpreted in different ways in philosophical and pedagogical literature. The term axiology derives from the Greek axios, meaning value, and logos, meaning teaching or doctrine; in its broadest sense it denotes the study of values. In Uzbek philosophical literature, axiology is described as a system of knowledge concerning values, value

consciousness, the experience of valuing, axiological cognition, and value-based approaches [3, 8]. The concept of value, in turn, denotes the human, social, moral, cultural, and spiritual significance attributed to phenomena of reality [3].

Musurmonova emphasizes that values emerge in the interaction between human needs, aspirations, interests, goals, and the surrounding social world [2]. This interpretation makes it possible to distinguish three interconnected dimensions of value: an individual's practical and emotional attitude toward objects and phenomena; moral categories that characterize personal qualities; and social meanings that regulate relations among people. The development of the value concept has therefore led to the differentiation of economic, psychological, moral, aesthetic, cognitive, social, national, and other value domains.

The competence-based approach is one of the central ideas in the modernization of education. It extends educational outcomes beyond the traditional accumulation of knowledge, skills, and abilities and focuses on the learner's capacity to use knowledge and experience in meaningful activity. Competence is commonly associated with an integrated system of knowledge, practical experience, motivation, problem-solving capability, and readiness for professional and personal activity [1, 2, 10]. In relation to teacher education, spiritual competence may therefore be interpreted as an integrated readiness to understand, evaluate, and act according to socially and personally significant moral values. Earlier studies by Norboyeva have examined the theoretical, pedagogical, and psychological conditions for developing spiritual competence in students and future teachers [4-7].

Scientific-pedagogical and philosophical literature classifies values into a number of interrelated groups, including spiritual, national, political, legal, labor, everyday-life, religious, general cultural, universal human, artistic, and health-related spiritual values [9]. Spiritual values play a central role in the moral formation of the personality. They are embodied in intellectual and scientific achievements, education, health culture, national heritage, language, literature, art, traditional crafts, historical and architectural monuments, customs, festivals, the spiritual heritage of Eastern and Western thinkers, oral and written cultural traditions, music, games, and forms of productive activity. Their practical meaning becomes visible in a person's attitude toward other people, family, society, homeland, work, and personal responsibility.

Methodologically, the study uses theoretical analysis of pedagogical, philosophical, and psychological sources, comparison of conceptual interpretations, classification, synthesis, and pedagogical modeling. The practical part systematizes reflective games and training activities described in the source material as mechanisms for supporting the development of students' spiritual values. The proposed framework is conceptual and practice-oriented; it does not claim statistical experimental verification within the scope of this article.

RESULTS AND DISCUSSION

The axiological approach suggests that the development of a system of spiritual values in students is connected with several aspects of self-development: readiness for continuous personal growth and professional mobilization; the ability to organize one's own work; moral self-regulation; value-semantic development; a high degree of independence; readiness for purposeful activity; conscious behavior aimed at self-improvement; stability of aspirations toward personal maturity; creativity in activity; and the effectiveness of becoming a professional.

The development of spiritual values is a complex process composed of mutually related elements. On the basis of the analyzed material, the following components can be distinguished: need, interest, motive, purpose of activity, moral ideals, and internalization. These components

form a dynamic cycle rather than a rigid linear sequence. Needs activate attention to value-laden situations; interest gives personal orientation to the situation; motives connect the need with a goal; activity provides an opportunity to test values in practice; moral ideals provide criteria for evaluation; and internalization consolidates the accepted value as part of the individual's inner regulatory system.

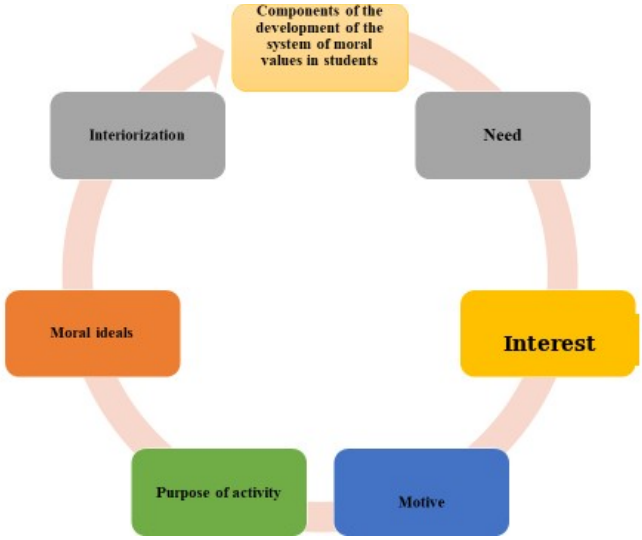


Figure 1. Structural components of the development of students' system of spiritual values.

Students express value attitudes through different forms of behavior and activity. Through evaluative relations, new spiritual values are assimilated and previously acquired values, such as social norms, viewpoints, judgments, and rules, are strengthened in consciousness. Evaluation is therefore not an auxiliary operation but one of the mechanisms through which values become personally significant.

Needs can be considered both a source and a condition of human activity. At an initial stage, a need may exist as an internal state that has not yet become active behavior. A value capable of satisfying that need then appears as an ideal or desired state. The learner compares this ideal with knowledge of the real world and selects possible means for achieving it. At a subsequent stage, the need becomes an active force that directs concrete behavior, and its content becomes more specific through interaction with external reality.

A need intensifies activity and is transformed as activity develops. What initially exists as an internal condition is progressively converted into a goal and then into a result. Needs are oriented toward the future and perform a regulatory function because they help organize patterns of life activity. The transition from need to goal is not automatic: it is mediated by motive. Contradictions between a person's present state and desired conditions create the psychological tension that stimulates activity and encourages efforts to change or preserve relevant conditions.

From a pedagogical perspective, the development of students' spiritual values can be supported by purposefully organized training sessions and psychological-pedagogical games. Such activities are valuable because they combine cognitive interpretation with emotion, communication, self-evaluation, and decision-making. The following activities illustrate this approach.

The "Values" exercise. Participants receive six sheets of paper and write one value on each sheet, arranging the values according to their personal importance. They are then asked to imagine that circumstances have deprived them of the value written on the first sheet. The sheet is crumpled and set aside, and participants try to imagine life without that value. The same procedure

is repeated until each value has temporarily been "lost." Participants then recall the emotions experienced during this process. The facilitator announces that the values can be returned one by one, and the participants retrieve the crumpled sheets. They compare their initial hierarchy with their feelings after the temporary loss and decide whether the values still occupy the same places. The final discussion focuses on changes in the perceived importance of particular values and on the reasons for these changes.

The "I have never..." exercise. Participants take turns completing the sentence "I have never..." with a statement related to moral behavior, for example, "I have never deliberately lied," "I have never spoken disrespectfully to an older person," or "I have never used insulting words." Other participants indicate whether the statement is true for them according to the rules established by the facilitator. The task encourages students to compare declared norms with their own behavior and to reflect on the personal significance of moral standards. The facilitator emphasizes honesty, respect, and the absence of ridicule or public humiliation.

The "It is not acceptable..." exercise. The group is divided into two teams. Members of the first team express wishes, attitudes, or problematic statements, while members of the second team respond with a reasoned rejection or an alternative value-based position. After approximately ten minutes, the groups change roles. Statements may concern self-doubt, attitudes toward teachers or peers, friendship, responsibility, and freedom of expression. After the exercise, participants analyze the arguments used to reject harmful or ethically questionable positions, paying attention to the reasons and value assumptions behind each response.

The "Sense of Dignity" training. The aim is to develop self-expression, self-assessment, and constructive feedback skills. Each participant first prepares a list of personal characteristics. One student reads the list aloud, after which other students provide feedback. Feedback is given only when requested, refers to specific words or actions, avoids humiliation and personal insults, does not reduce the person to a general label, and does not take the form of unsolicited advice. The procedure continues until all participants who wish to take part have received feedback. The educational value of the exercise lies in combining self-perception with the perception of others while maintaining ethical communication.

The "Projective Drawing" training. Participants create two drawings: "What I am like" and "What I would like to be like." Approximately five minutes are allocated to each drawing, and the drawings are not signed. Artistic quality is not evaluated. The drawings are displayed, one is selected, and participants describe what they see, what they feel, how they think the author perceives himself or herself, and what the author might wish to change. Only after the discussion may the author identify the drawing and explain the intended meaning. The activity supports reflection on self-image, aspirations, and the internalization of personally meaningful values.

The "Forbidden Fruit" exercise. The purpose is to identify motives associated with behavior that is perceived as prohibited. A box is placed in a visible location with signs stating that it must not be opened. The facilitator stimulates curiosity without removing the prohibition. During the discussion, participants describe what they felt, whether they wished to look inside, what helped or prevented them from breaking the rule, and why prohibitions can sometimes increase the attractiveness of an action. The final analysis considers the motives that may lead people to violate moral or social restrictions and the role of self-control in responsible behavior.

The "Analysis of Spiritual Values" exercise. Cards describing six spiritual values are placed in different parts of the room. Participants read the definitions, select the value they consider most important, and stand near the corresponding card. Each group then formulates arguments

explaining why its chosen value plays a leading role in life. Participants present their reasoning and respond to questions or objections from others. The facilitator concludes by emphasizing that people may hold different hierarchies of values and that effective communication requires recognition of these differences without abandoning core ethical principles.

Analysis in epistemology and psychology encompasses operations connected with cognition and practical activity; in pedagogy it refers to the intellectual process of separating a phenomenon into components in order to reveal its structure, relationships, and regularities. Self-analysis is usually treated as a component of self-awareness, self-knowledge, self-regulation, and self-assessment. Its educational importance lies in the fact that students' personal and professional self-concepts develop through reflection on their own interests, motives, needs, abilities, behavior, and value orientations.

Methods of self-analysis require students to move from general social situations to the examination of their own behavior and personal characteristics; to formulate criteria for evaluating personal qualities; to distinguish what is known from what remains unclear; and to identify internal contradictions. Self-analysis precedes and supports self-awareness because it transforms separate impressions into a more generalized understanding of the self. Through this process, students clarify who they are, how they understand their place in society, and how they may be perceived by others.

Self-awareness contains both emotional and logical components. It requires the clarification and generalization of information obtained through reflection at both levels. Consequently, systematic self-analysis and self-awareness contribute to the formation of a more realistic self-image and provide an internal basis for moral self-regulation, responsible professional behavior, and further personal development.

CONCLUSION

Science, creativity, cultural traditions, and ethical or religious principles can all contribute to the spiritual development of society and to the moral and cultural growth of the individual. Nevertheless, knowledge, talent, or belief alone does not automatically constitute spirituality. They acquire genuine moral significance when a person's aspirations and practical actions are subordinated to humane ethical principles and when those principles become stable regulators of everyday and professional behavior.

Moral qualities occupy a leading place within the structure of spiritual values, but the different dimensions of spirituality are interconnected. Moral, aesthetic, intellectual, ecological, cultural, and practical dimensions do not exist in isolation. Their integration forms a complex spiritual structure centered on goodness, compassion, dignity, beauty, conscience, knowledge, respect for other people, and responsible interaction with nature.

For higher education, the competence-based and axiological approaches are complementary. The competence-based approach focuses on the integrated readiness of the graduate for professional and personal activity, whereas the axiological approach clarifies the value foundations that give this readiness moral direction. Developing core spiritual competencies in future teachers therefore requires more than transmitting normative knowledge. It requires educational situations in which students interpret values, experience their personal meaning, make choices, act, reflect, receive feedback, and internalize accepted principles. The proposed system of reflective games and training exercises can serve as a practical component of this process when used ethically and adapted to the age, cultural context, and professional needs of students.

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PEDAGOGICAL POTENTIAL OF ART PROJECTS IN SHAPING CORPORATE VALUES AMONG STUDENTS

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Abstract. *This article examines the pedagogical potential of art projects in shaping corporate values among university students. An art project is interpreted not merely as an aesthetic event but as a structured educational environment in which students negotiate shared goals, assume complementary roles, manage time and resources, communicate with an audience, and evaluate collective outcomes. The article explains how participation in creative projects can transform such values as respect, responsibility, cooperation, integrity, initiative, and organizational belonging into observable forms of behavior. It also identifies the pedagogical conditions, stages, methods, and assessment tools required for value-oriented art projects to produce sustainable educational results.*

Keywords: *art project, corporate values, university student, cooperation, responsibility, organizational belonging, creative activity, reflection, assessment.*

Corporate values influence how members of an educational organization interpret common goals, communicate with one another, distribute responsibility, and respond to difficulties. In higher education, these values cannot be developed through slogans or formal instructions alone. Students need situations in which a declared value becomes a practical decision and its consequences can be experienced, discussed, and evaluated.

Art projects offer such situations because they connect intellectual, emotional, social, and organizational activity. A theatre performance, exhibition, student film, podcast, festival, design campaign, or public art initiative requires both creative freedom and coordinated action. The educational significance of the project lies not only in the final product but also in the quality of relationships and decisions through which that product is created.

The concept of an art project combines artistic creation with purposeful organization. Students identify a socially or institutionally meaningful issue, select an artistic language, define an audience, plan the process, distribute roles, create a product, and present it publicly. Each step generates a real need for communication, mutual dependence, and responsible choice. Corporate values therefore become functional conditions of successful activity.

John Dewey viewed art as an experience in which action, perception, emotion, and meaning form an integrated whole [1, pp. 35–57]. This idea is pedagogically important because a value becomes personally significant when it is connected with lived experience. A student understands cooperation more deeply after depending on the timely contribution of team members than after merely memorizing its definition.

The term corporate values in this article refers to shared principles that guide behavior within a university community. They may include respect for human dignity, academic integrity, commitment to quality, responsibility for a common result, openness to dialogue, initiative, and

care for the institution's reputation. These principles are corporate because they connect individual conduct with the identity and mission of the organization.

An art project makes values visible. Respect appears in attentive listening and ethical representation of people. Responsibility is expressed through meeting deadlines and completing an assigned role. Integrity is demonstrated through accurate attribution and rejection of plagiarism. Cooperation is seen in joint planning, constructive disagreement, and support for another participant. Thus, value development can be observed in concrete actions rather than inferred from declarations.

The first pedagogical potential of art projects is their capacity to create emotionally meaningful learning. Artistic images allow students to approach a value not only through abstract reasoning but also through empathy, imagination, and personal interpretation. Elliot Eisner argues that the arts develop forms of thinking needed for dealing with ambiguity, qualitative judgment, and multiple possible solutions [2, pp. 70–92].

This openness is especially valuable for corporate culture education. Real organizational situations rarely have one mechanically correct answer. Students must consider the needs of different participants, balance individual expression with collective goals, and judge whether a solution is ethically acceptable. Artistic work provides a relatively safe space in which such complex choices can be rehearsed and reconsidered.

The second potential is the development of cooperation as a practiced capability. Richard Sennett describes cooperation as a craft grounded in listening, discussion, and productive engagement with difference [3, pp. 3–34]. In an art project, students encounter different tastes, abilities, working rhythms, and interpretations. The task cannot be completed well unless these differences are coordinated rather than suppressed.

For this reason, the teacher should avoid allowing one highly active student to control the entire process. Roles need to be distributed transparently and, when possible, rotated. A student who usually performs may be asked to coordinate communication, while a technically skilled participant may document group decisions. Role rotation expands participation and helps students understand the interdependence of creative and organizational labor.

The third pedagogical potential is the formation of responsible initiative. Art projects invite original ideas, yet every idea must be connected with audience needs, available resources, ethical limits, and the agreed purpose. Students learn that initiative is not spontaneous activity without accountability. It is the ability to propose a meaningful course of action, justify it, mobilize others, and accept responsibility for implementation.

Mihaly Csikszentmihalyi explains creativity as an interaction among the individual, a symbolic domain, and a social field that recognizes and evaluates novelty [4, pp. 27–50]. Applied to higher education, this view shows why creativity should not be reduced to personal inspiration. A student's idea gains educational and social value when it is communicated, tested, revised, and accepted within a community of practice.

The fourth potential concerns organizational belonging. A project devoted to the university's history, ethical principles, social mission, or student experience can connect institutional values with personal narratives. Students do not simply receive an official message; they reinterpret it through interviews, images, performances, or digital stories. This process can turn an impersonal institutional statement into a shared cultural meaning.

Belonging, however, must not be confused with conformity. A mature corporate culture permits respectful criticism and includes different voices. Value-oriented art projects should

therefore create opportunities for students to identify contradictions between declared values and everyday practices. Constructive artistic reflection can help an institution see problems while preserving dialogue and commitment to improvement.

The fifth potential is the development of disciplined artistic thinking. Lois Hetland and her colleagues identify studio habits such as observing, envisioning, expressing, reflecting, engaging and persisting, developing craft, stretching and exploring, and understanding art worlds [5, pp. 5–18]. These habits are also relevant to corporate behavior because they connect personal mastery with perseverance, dialogue, and awareness of a wider professional community.

A project participant must persist when the first solution fails, refine technical quality, explain choices, accept feedback, and reconsider the relationship between form and purpose. Such actions cultivate a culture of quality. The final product matters, but quality is understood as a process of revision and collective responsibility rather than as a demand imposed only at the end.

The sixth potential is reflective self-regulation. Lev Vygotsky emphasized that imagination transforms elements of lived experience and recombines them into new forms [6, pp. 15–35]. Reflection completes this creative movement by helping students compare intention, action, and outcome. It allows them to recognize how their behavior supported or weakened the team's values.

Useful reflection questions include: Which decision best represented our shared values? Whose contribution was insufficiently heard? How did we respond to disagreement? Did the allocation of work remain fair? What did the audience understand differently from what we intended? What should be changed in the next project? Written reflection, dialogue circles, and peer feedback can convert experience into an explicit plan for improvement.

The pedagogical organization of a value-oriented art project may follow four connected stages. The diagnostic and motivational stage identifies students' current understanding of corporate values, their previous teamwork experience, and the cultural issues they consider important. Short questionnaires, interviews, observation, case discussions, and analysis of institutional situations can be used for this purpose.

At the design stage, the group defines the value focus, target audience, artistic form, expected product, responsibilities, timeline, resources, ethical requirements, and assessment criteria. The value focus must be specific. Instead of a broad instruction to demonstrate respect, the group can define observable indicators such as listening without interruption, acknowledging authorship, using inclusive language, and responding constructively to criticism.

At the creative and implementation stage, the teacher acts as a facilitator. The teacher observes interaction, asks clarifying questions, provides timely feedback, and intervenes when safety or dignity is at risk. Excessive control weakens student ownership, whereas complete withdrawal may leave unequal participation and conflict unresolved. Productive facilitation preserves autonomy while keeping the project aligned with its educational purpose.

The presentation and reflection stage brings the product into a social space. Audience response helps students test whether the intended value was communicated clearly and ethically. Assessment should combine the quality of the artistic product with evidence from the process: planning records, observation notes, peer assessment, individual reflection, portfolio materials, and audience feedback.

CONCLUSION. Art projects possess substantial pedagogical potential for shaping corporate values because they translate abstract principles into emotionally meaningful and socially accountable activity. Through collective creation, students experience how respect, integrity, cooperation, responsibility, initiative, quality, and organizational belonging affect a real

common result. The artistic product becomes both an expression of values and evidence of the decisions through which those values were enacted.

This potential is realized only when the project has an explicit value focus, shared goals, transparent roles, inclusive participation, ethical safeguards, formative feedback, and structured reflection. Evaluation must address not only the attractiveness of the final product but also changes in student behavior and the quality of teamwork. Under these conditions, art projects become a sustainable pedagogical mechanism for strengthening corporate culture in higher education.

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TECHNOLOGIES FOR DEVELOPING THE SPIRITUAL COMPETENCE OF FUTURE HISTORIANS ON THE BASIS OF NATIONAL VALUES

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Abstract. *The article examines technologies for developing the spiritual competence of future historians on the basis of national values. Spiritual competence is interpreted not as an additional educational quality but as an integral component of professional competence, since the selection, interpretation and evaluation of historical reality inevitably involve value judgments. The study combines axiological, competence-based and cultural-historical approaches and uses theoretical analysis, structural-functional modelling, comparative analysis and synthesis of pedagogical experience. A five-component structure of spiritual competence is substantiated: axiological-motivational, cognitive-worldview, historical-axiological analytical, communicative-educational and reflective-personal. The mechanism for integrating national values into professional training is specified, and six interrelated pedagogical technologies are proposed: source-based axiological analysis, historical-ethical case study, project-based learning, polylogue and discussion, reflective technologies, and digital-media technologies. A four-stage implementation model and a criterion-based diagnostic framework are also presented. The proposed model is intended to connect value education directly with historians' professional activities and to strengthen students' resistance to historical falsification and manipulative media narratives.*

Keywords: *spiritual competence, national values, future historian, axiological approach, historical thinking, historical memory, pedagogical technology, case study, reflection, media literacy, professional training.*

Аннотация. *В статье исследуются технологии развития духовной компетентности будущих историков на основе национальных ценностей. Духовная компетентность рассматривается как неотъемлемая часть профессиональной компетентности историка, поскольку отбор, интерпретация и оценка исторической реальности предполагают ценностную позицию. Исследование опирается на аксиологический, компетентностный и культурно-исторический подходы. Обоснована пятикомпонентная структура духовной компетентности, определён механизм интеграции национальных ценностей в содержание профессиональной подготовки, предложены шесть взаимосвязанных педагогических технологий, четырёхэтапная модель реализации и критериально-диагностический аппарат. Особое внимание уделяется источниково-аксиологическому анализу и медиаграмотности как средствам противодействия фальсификации истории.*

Ключевые слова: *духовная компетентность, национальные ценности, будущий историк, аксиологический подход, историческое мышление, педагогическая технология, рефлексия, медиаграмотность.*

INTRODUCTION

The historian's profession is inherently value-laden. Historians do not merely accumulate facts; they select particular events from an unlimited range of past phenomena, establish causal and contextual relationships, reconstruct the intentions of historical actors and assess the significance of actions and consequences. Each of these operations presupposes criteria of relevance and evaluation. Therefore, the moral and spiritual maturity of a historian cannot be treated as an external supplement to professional preparation. It constitutes an internal element of professional competence because historical knowledge is produced and communicated through decisions that contain both epistemological and axiological dimensions.

This issue has become especially important in the contemporary information environment. Global communication platforms provide students with unprecedented access to archival materials, digital collections and international scholarship, but they also intensify the circulation of decontextualized quotations, fabricated documents, politically motivated interpretations and emotionally manipulative narratives. A future historian who lacks a stable value orientation and critical source literacy may become vulnerable either to ideological manipulation or to historical nihilism. Professional training must therefore combine methodological rigor with the capacity to recognize ethical problems, distinguish evidence from interpretation and communicate historical knowledge responsibly.

Uzbekistan's education policy also emphasizes the unity of professional knowledge, independent thinking and moral qualities. The Law "On Education" establishes the humanistic character of education and its orientation toward national and universal values [1]. The Concept for the Development of the Higher Education System until 2030 requires the preparation of specialists who possess modern knowledge, independent thinking and high moral qualities [2]. The national framework for spiritual and educational work similarly stresses humanism, civic responsibility and the movement from national revival toward national progress [3]. These provisions create a normative basis for integrating values into professional training rather than isolating spiritual education in occasional extracurricular activities.

In actual university practice, however, a methodological imbalance can be observed. Spiritual and educational activities are frequently organized as meetings, competitions, commemorative events or exhibitions, while specialist subjects are taught according to a separate disciplinary logic. Such activities can be useful, but when they are detached from source analysis, historiography, archival practice and professional communication, students may perceive values as a separate sphere unrelated to the historian's work. The research problem therefore consists in identifying pedagogical technologies that integrate national values into the content and methods of historians' professional preparation. The purpose of this study is to substantiate a structural model of spiritual competence, determine mechanisms for integrating national values into history education, and systematize technologies, stages and diagnostic criteria for its development.

LITERATURE REVIEW

The contemporary interpretation of competence was significantly developed by J. Raven, who treated competence as more than a sum of knowledge and skills and included motivation, values and emotional attitudes in its structure [7]. This position is methodologically important because it means that value orientation should be developed inside professional activity. A. V. Khutorskoy similarly identifies value-semantic competence among the key competences of personality-oriented education [8]. From this perspective, spiritual competence may be understood

as the ability to make professionally responsible judgments on the basis of internalized values rather than as the formal reproduction of moral norms.

The axiological foundations of the study are also connected with S. H. Schwartz's theory of basic human values. Schwartz defines values as trans-situational goals that function as guiding principles in human life and form a structured system of relations [9]. This approach allows national and universal values to be interpreted not as mutually exclusive categories but as interconnected levels of orientation. In Uzbek philosophical and pedagogical thought, A. Erkaev has emphasized spirituality as an important condition of national self-consciousness [5], while U. Tolipov and M. Usmonboeva have systematized the applied foundations of pedagogical technologies [6]. These works provide a local conceptual basis for translating values into educational practice.

Research on history education contributes another essential dimension. S. Wineburg describes historical thinking as an "unnatural" form of reasoning because students must learn to understand the past within its own context rather than automatically applying present-day assumptions [10]. P. Seixas and T. Morton include the ethical dimension among the central concepts of historical thinking and draw attention to the limits of judging past actors exclusively through contemporary moral standards [11]. K. Barton and L. Levstik connect history education with democratic and civic life, emphasizing the social purposes of learning history [12]. J. Rüsen, in turn, interprets historical consciousness as a meaning-making system that helps individuals orient themselves in time [13]. Taken together, these perspectives show that professional historical thinking necessarily includes moral reflection, contextual judgment and responsible communication.

The literature therefore reveals two well-developed but insufficiently integrated research lines. The first examines competence, values and moral development at a general pedagogical level; the second studies historical thinking, source criticism and the ethical dimension of interpreting the past. The research gap lies in the lack of a coherent technological model that integrates national values directly into the professional tasks of future historians. The present study addresses this gap by linking value education with source analysis, discussion, project activity, reflection and media literacy.

MATERIALS AND METHODS

The study is theoretical and methodological in design. It combines three complementary approaches. The axiological approach treats values as criteria for selecting, structuring and interpreting educational content. The competence-based approach defines the expected result not through the amount of reproduced information but through a student's ability to act in meaningful professional situations. The cultural-historical approach interprets national values as historically formed and dynamically developing phenomena. This is particularly important for historians, who must be able to study the origins and transformation of values rather than present them as a fixed list of unquestionable statements.

The main methods included theoretical analysis of pedagogical, philosophical and history-education literature; analysis of normative documents; structural-functional modelling; comparative examination of international approaches to historical thinking; synthesis of expert and pedagogical observations; and construction of a criterion-based diagnostic framework. The original research concept also envisages questionnaire surveys, situational tasks, essay analysis, expert assessment, self-assessment and pedagogical observation as complementary diagnostic

instruments. Because spiritual competence is a complex latent quality, no single instrument should be treated as sufficient. Diagnostic conclusions should rely on triangulation, that is, comparison of at least two independent sources of evidence for each criterion.

Methodologically, the model follows three principles. First, each component of spiritual competence must correspond to a recognizable professional task of the historian. Second, values should be integrated into activities in which students analyse, interpret and communicate historical evidence rather than taught only through declarative statements. Third, assessment should serve developmental purposes and should avoid reducing moral qualities to a mechanical rating score. These principles determined the structure of the results presented below.

RESULTS AND DISCUSSION

The analysis resulted in a five-component model of spiritual competence. The components are functionally interconnected rather than hierarchically arranged. The axiological-motivational component initiates professional engagement; the cognitive-worldview component provides conceptual knowledge; the historical-axiological analytical component connects value judgment with source-based professional reasoning; the communicative-educational component governs responsible public presentation of historical knowledge; and the reflective-personal component enables self-correction and ethical self-assessment. The historical-axiological analytical component occupies a central position because it is the point at which spirituality and professional historical work become inseparable.

Table 1. Components of the spiritual competence of a future historian

Component	Content	Indicators of manifestation
Axiological-motivational	Acceptance of national and universal values as personal and professional orientations.	Internal motivation to study history; respect for cultural heritage; sense of professional duty; priority of historical truth.
Cognitive-worldview	Systemic knowledge of national values, their historical formation and contemporary meaning.	Ability to explain the genesis of values; distinguish ideological constructs; connect national and universal dimensions.
Historical-axiological analytical	Ability to analyse sources, events and historical actors through contextualized value criteria.	Identification of an author’s value position; recognition of ethical dilemmas; avoidance of anachronism; evidence-based conclusions.
Communicative-educational	Responsible communication of historical knowledge in academic and public contexts.	Reasoned discussion; respectful dialogue with alternative views; production of scientifically grounded popular texts.
Reflective-personal	Awareness and critical evaluation of one’s own value position and professional conduct.	Recognition of subjectivity; willingness to correct errors; adequate self-assessment; commitment to continuous moral and professional growth.

The mechanism for integrating national values into educational content may follow either a declarative or an integrative path. In the declarative model, values are presented as a separate topic, lecture or extracurricular event. This can increase awareness but does not necessarily transform professional judgment. In the integrative model, value questions are embedded in tasks that students must solve as historians. For example, students may examine how a chronicler's political position influenced source selection, compare contrasting interpretations of the same event, or assess the ethical implications of publishing sensitive oral-history material. In such tasks, values are not merely discussed; they become operational criteria of professional activity.

Several content channels can support this integration. The scientific heritage of al-Biruni, al-Farabi, Ibn Sina and Mirzo Ulugbek can be connected with contemporary standards of evidence, scholarly honesty and intellectual responsibility. Traditions of statehood can be used to analyse historical concepts of justice, public duty and governance without turning them into simplified moral examples. The ethical and educational heritage associated with hadith scholarship and Sufi thought can be discussed in relation to verification, transmission and responsibility for testimony. Local traditions, mahalla history, family genealogy and oral history can serve as authentic material for learning interviewing, source criticism and the ethics of representing community memory. In this way, national values move from being objects of memorization to becoming instruments for professional inquiry.

On the basis of this mechanism, six pedagogical technologies were systematized. Their purpose is not to function as isolated methods but as a coordinated set. Each technology primarily develops particular components while simultaneously supporting the others. Source-based axiological analysis acts as the core technology because it embeds value reflection directly in historians' central professional operation: working with evidence.

Table 2. Technologies for developing spiritual competence on the basis of national values

Technology	Main purpose	Forms of implementation	Components
Source-based axiological analysis	Combine source criticism with value analysis.	Written monuments, documents, memoirs; reconstruction of author position; comparison of sources.	2, 3, 5
Historical-ethical case study	Develop reasoned value judgment through historical dilemmas.	Problem situations; alternative solutions; contextual evaluation of historical actors.	1, 3, 5
Project-based learning	Transfer values from knowledge into socially meaningful activity.	Local history, family genealogy, historical memory projects; museum and archive practice.	1, 4, 5
Polylogue and discussion	Develop evidence-based tolerance toward alternative interpretations.	Debate, historical trial, role play, academic discussion clubs.	3, 4, 5

Reflective technologies	Develop awareness and revision of one's own position.	Historian's diary, essay, portfolio, peer assessment, reflective interview.	1, 5
Digital-media technologies	Build resistance to historical falsification and manipulation.	Media-text examination, virtual museums, digital archives, fake-analysis seminars.	2, 3, 4

Source-based axiological analysis requires the student to ask not only whether a source is authentic or reliable but also what the author considered important, which groups or events are omitted, what evaluative vocabulary is used, and how the author's social position shapes the narrative. The decisive methodological step occurs when the student turns the same questions toward his or her own interpretation. This transition from analysing the value position of the source to examining the interpreter's value position develops professional self-awareness without abandoning evidence-based historical reasoning.

Historical-ethical case study builds on the ethical dimension of historical thinking described by Seixas and Morton [11]. Students are presented with historically complex situations in which no conclusion can be reached by simply applying contemporary norms. They must reconstruct context, compare available options and justify an assessment while avoiding both moral relativism and presentism. Project-based learning extends the process into socially meaningful practice: local-history projects, family genealogy, archive work and museum activities require students to negotiate questions of memory, representation, consent and public responsibility. Polylogue and discussion technologies develop the capacity to defend an interpretation with evidence while recognizing the legitimacy of reasoned disagreement.

Reflective technologies are necessary because professional ethics cannot develop only through external control. A historian's diary, portfolio, reflective essay and peer review allow students to identify how their assumptions change in response to evidence. Digital-media technologies have particular contemporary relevance. Students should learn how historical falsification is constructed through decontextualization, selective quotation, false attribution, emotionally charged imagery and repetition. Analysing real media texts, checking claims against reliable sources and reconstructing the omitted context transforms media literacy into a professional historical competence rather than a general digital skill.

The implementation process is organized in four recurring stages. The motivational-orienting stage helps students understand the connection between professional responsibility and values through problem questions, examples from the work of historians and initial diagnostic tasks. The content-knowledge stage develops systematic understanding of national values, their historical formation and contemporary interpretations. The activity-practical stage places students in professional situations involving source analysis, case studies, discussion, archival practice and project work. The reflective-evaluative stage focuses on self-assessment, peer feedback, portfolio analysis and revision of one's professional position. The model is spiral rather than strictly linear: the same stages recur at increasingly complex levels throughout the period of study.

For diagnostic purposes, five criteria correspond to the competence structure: value orientation, systemic knowledge, analytical skill, communication culture and reflexivity. Each criterion may be described at low, medium and high levels. The framework is not intended to assign a moral "grade" to the student. Its function is to identify developmental needs, select

appropriate educational tasks and monitor qualitative change. The most important methodological requirement is triangulation: conclusions about a student's development should not depend solely on self-report or on a teacher's subjective impression.

Table 3. Criteria and levels for assessing the development of spiritual competence

Criterion	Low level	Medium level	High level
Value orientation	Values are perceived mainly as external requirements.	Values are recognized but inconsistently guide activity.	Values are internalized and consciously guide professional action.
Systemic knowledge	Fragmented and reproduction-based knowledge.	Systematic knowledge with limited transfer to practice.	Systemic knowledge supports independent conclusions and professional judgment.
Analytical skill	Difficulty critically evaluating sources.	Source analysis is present, but the value dimension is weakly recognized.	The value position of a source is independently identified and contextually interpreted.
Communication culture	Alternative views are rejected or ignored.	Other views are heard, but evidence-based argument remains unstable.	Discussion is evidence-based, tolerant, consistent and professionally responsible.
Reflexivity	Own position is poorly recognized.	Own position is recognized but rarely revised.	Own assumptions are critically evaluated and consciously improved.

The proposed model has several practical implications. First, the development of spiritual competence should begin within specialist history courses rather than be delegated exclusively to extracurricular educational work. Second, a special course such as "Professional Ethics of the Historian and Axiological Analysis of Historical Sources" could integrate national scholarly heritage, source methodology and academic integrity. Third, value-oriented modules can be embedded in existing subjects through source tasks, ethical cases and historiographical debates. Fourth, regular media-literacy seminars should use authentic digital content and teach students to verify provenance, context and argumentation. Fifth, archive, museum and local-history practice should be strengthened because direct engagement with cultural heritage creates conditions for combining professional skill with responsible value orientation.

Implementation requires caution. National values should not be reduced to ideological slogans or used to suppress scholarly plurality. A historian's spiritual competence must include fidelity to evidence, openness to correction and respect for alternative interpretations. The aim is to develop historically contextualized, ethically responsible and evidentially justified judgment rather than predetermine conclusions.

CONCLUSION

The study substantiates spiritual competence as an integral component of the professional competence of future historians. Historical selection, interpretation and evaluation are never completely value-neutral, and professional preparation should therefore develop not only factual knowledge and methodological skills but also the capacity for responsible value judgment. The

proposed structure includes five interconnected components, with historical-axiological analysis functioning as the core link between spirituality and professional historical reasoning.

National values are most effectively integrated through professional tasks rather than through isolated declarative instruction. Source-based axiological analysis, historical-ethical case study, project-based learning, polylogue and discussion, reflective technologies, and digital-media technologies form a coherent toolkit for this purpose. Their implementation through motivational, content, practical and reflective stages creates a spiral process of long-term development. Diagnostic work should rely on multiple evidence sources and should be used primarily to support development rather than mechanical ranking.

Practical recommendations include integrating value-oriented tasks into specialist history courses; introducing professional ethics and axiological source analysis; strengthening archive, museum and local-history practice; conducting systematic media-literacy training; and improving teachers' axiological-methodological preparation. Further research should comparatively test the proposed technologies, validate diagnostic instruments and examine future historians' value judgments in digital environments.

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PEDAGOGICAL CONDITIONS FOR DEVELOPING THE PROFESSIONAL COMPETENCE OF FUTURE PRIMARY SCHOOL TEACHERS IN THE NATIVE LANGUAGE SUBJECT WITHIN CREDIT-MODULE EDUCATION

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Abstract. *The article substantiates the pedagogical conditions required for the systematic development of the professional competence of future primary school teachers in the native language subject within credit-module education. The study is based on the competence-based, activity-oriented, student-centred and reflective approaches to teacher education. Regulatory documents governing the modernization of higher pedagogical education, the principles of the European Credit Transfer and Accumulation System (ECTS), and scholarly works on professional and pedagogical competence were analysed and synthesized. As a result, five interrelated pedagogical conditions were identified: outcome-based modular design of the native language course; integration of linguistic knowledge with pedagogical content knowledge; organization of guided independent learning through authentic professional tasks; criterion-referenced formative assessment and reflective self-assessment; and creation of a digitally supported, practice-oriented learning environment. The article proposes a structural relationship between these conditions and the cognitive, methodological, communicative, digital and reflective components of professional competence. It is argued that the effectiveness of credit-module education depends not only on the calculation of credits, but also on the alignment of learning outcomes, student workload, teaching activities and assessment evidence. The proposed conditions may serve as a methodological basis for designing native language modules, independent-study assignments and assessment tools in primary teacher education programmes.*

Keywords: *credit-module education, future primary school teacher, professional competence, native language teaching, pedagogical conditions, independent learning, pedagogical content knowledge, formative assessment, reflection, ECTS.*

INTRODUCTION

The modernization of higher pedagogical education is increasingly associated with a shift from the transmission of disciplinary knowledge to the formation of professional competence that can be demonstrated in authentic teaching situations. In Uzbekistan, this shift is supported by the national strategy for the development of higher education up to 2030, which emphasizes modern teaching technologies, the improvement of educational quality, academic autonomy and the preparation of highly qualified specialists capable of meeting changing social and labour-market requirements [1]. The development of pedagogical education therefore requires not only the

renewal of curricula, but also a reconsideration of how learning outcomes, student workload, independent study and assessment are connected within a credit-module structure.

The credit-module model has particular methodological significance for teacher education. According to the ECTS Users' Guide, credits are linked to learning outcomes and the workload required to achieve them; consequently, a credit cannot be interpreted merely as a quantitative unit of classroom hours [2]. In a professionally oriented programme, the logic of a module should proceed from what a student is expected to know, understand and be able to perform, and assessment should provide evidence that these outcomes have actually been achieved. For future primary school teachers, such alignment is especially important because professional readiness is multidimensional: a teacher must combine subject knowledge, pedagogical knowledge, communication skills, the ability to design learning activities, assessment literacy, digital competence and reflective self-development.

The native language subject occupies a central place in the professional preparation of future primary school teachers. A primary teacher does not simply reproduce rules of grammar, orthography, vocabulary or text structure. The teacher must transform linguistic content into age-appropriate learning tasks, anticipate typical misconceptions, explain language phenomena clearly, organize oral and written communication, support reading and writing development, provide formative feedback, and adapt instruction to learners with different educational needs. In this sense, native language preparation is simultaneously linguistic and pedagogical. The quality of professional competence depends on how successfully these two dimensions are integrated.

The concept of pedagogical content knowledge introduced by Shulman explains this integration by distinguishing knowledge of subject matter from knowledge of how to make that subject matter learnable for particular students [3]. Later studies of teacher quality similarly demonstrate that effective teacher preparation should connect disciplinary knowledge, teaching practice, assessment, analysis of student learning and continuous professional reflection [4]. This theoretical position is directly relevant to the preparation of primary school teachers in the native language discipline, where mastery of linguistic concepts alone does not guarantee the ability to teach them effectively.

Previous research by the author has considered the content and general methods of developing the professional competence of future primary school teachers under credit-module conditions [5, 6]. However, the pedagogical conditions specifically ensuring the development of competence through the native language subject require a more differentiated analysis. The scientific problem lies in identifying the organizational, didactic and assessment-related conditions that transform the formal possibilities of credit-module education into real mechanisms of professional development.

The purpose of this study is therefore to substantiate a system of pedagogical conditions for developing the professional competence of future primary school teachers in the native language subject within credit-module education and to determine how these conditions correspond to the structural components of professional competence.

MATERIALS AND METHODS

The study has a theoretical and methodological character. Its source base includes national regulatory documents on the modernization of higher and pedagogical education, the ECTS Users' Guide, scholarly works on teacher competence and pedagogical content knowledge, and publications addressing the professional preparation of future primary school teachers. The

analysis was conducted through content analysis, comparative interpretation, conceptual synthesis, pedagogical modelling and generalization.

Content analysis was used to identify recurring principles related to learning outcomes, student workload, independent learning, professional tasks, assessment and reflection. Comparative interpretation enabled the requirements of the credit-module system to be correlated with the specific functions of a primary school teacher in native language education. Conceptual synthesis was then employed to formulate pedagogical conditions that are not isolated measures, but elements of a mutually reinforcing system.

For the purposes of this article, professional competence is understood as an integrated ability of a future primary school teacher to mobilize subject knowledge, pedagogical methods, communication strategies, digital tools, assessment procedures and reflective skills in order to solve professional tasks effectively and responsibly. This competence is represented by five interrelated components: (1) cognitive-subject competence; (2) methodological-didactic competence; (3) communicative competence; (4) digital and information competence; and (5) reflective-evaluative competence.

The criteria for selecting pedagogical conditions were the following: correspondence with the principles of credit-module education; direct relevance to native language teaching; orientation towards observable professional actions; support for student autonomy; compatibility with formative and summative assessment; and applicability in pedagogical higher education institutions. The resulting model is therefore intended as a methodological framework that can be operationalized in syllabi, module descriptors, independent-study tasks, microteaching sessions and teaching practice.

RESULTS AND DISCUSSION

The analysis shows that the development of professional competence in a credit-module environment cannot be secured by introducing credits, dividing a course into modules or increasing the amount of independent work alone. These organizational features become pedagogically meaningful only when they are connected through constructive alignment: intended learning outcomes determine learning activities, student workload is distributed according to the complexity of these activities, and assessment measures the same professional actions that the module is designed to develop. On this basis, five pedagogical conditions were identified.

The first condition is outcome-based modular design of the native language course. Each module should be formulated around professionally meaningful learning outcomes rather than a list of topics. For example, an outcome such as “the student explains phonetic or grammatical phenomena” reflects subject knowledge, whereas “the student designs and justifies an age-appropriate learning task for teaching a grammatical concept in Grade 3” reflects professional competence. The second type of outcome is more consistent with teacher education because it requires the student to transform disciplinary knowledge into pedagogical action.

Outcome-based design also changes the function of classroom and independent learning. Contact hours should be used for activities that require interaction, guidance, modelling and feedback: analysis of lesson fragments, collaborative task design, microteaching, discussion of learner errors and methodological decision-making. Independent workload should be used for preparation, reading, analysis of school textbooks, development of teaching materials, observation tasks, digital portfolio work and reflective writing. Such distribution corresponds to the credit-module principle that student workload includes all learning activities needed to achieve the declared outcomes [2].

The second condition is the integration of linguistic knowledge with pedagogical content knowledge. In the native language discipline, every major linguistic unit should be studied simultaneously from two perspectives: as an object of linguistic analysis and as an object of teaching. When students study word structure, sentence syntax, orthographic rules, vocabulary or coherent text, they should also investigate typical learner difficulties, age-specific explanations, visual or manipulative supports, question sequences, error correction strategies and assessment criteria. This integration prevents a common gap in teacher education in which students know the content but lack strategies for teaching it.

The practical mechanism for this integration may be a "content-to-teaching transformation cycle": linguistic analysis → identification of the learning difficulty → selection of an age-appropriate explanation → design of a task or exercise → prediction of possible learner responses → choice of feedback → reflection on effectiveness. Repeated use of this cycle gradually turns subject knowledge into pedagogical content knowledge [3]. It also creates direct evidence for assessing methodological competence.

The third condition is the organization of guided independent learning through authentic professional tasks. Credit-module education gives independent learning a significant place, but its educational value depends on the quality of the tasks. Reproductive assignments, such as copying definitions or producing summaries, have limited potential for competence development. Professionally authentic tasks are more effective because they imitate the intellectual actions of a teacher. Examples include analysing the methodological potential of a textbook exercise, redesigning an ineffective task, preparing a differentiated worksheet, developing a rubric for written work, constructing a five-minute explanation of a language rule, analysing pupils' typical errors, or creating a mini-lesson for a specific grade.

Independent work should nevertheless be guided rather than abandoned to the student. Guidance can be provided through task algorithms, assessment criteria, exemplars, consultation hours, peer review, staged deadlines and digital feedback. This balance between autonomy and support is important. Excessive control weakens independence, while insufficient scaffolding may transform independent learning into formal task completion. The teacher's role in a credit-module environment therefore shifts from the main source of information to the designer of learning trajectories, facilitator of professional problem solving and provider of feedback.

The fourth condition is criterion-referenced formative assessment combined with reflective self-assessment. Professional competence is difficult to develop when assessment focuses mainly on reproduction of theoretical information. Assessment criteria should describe the quality of professional performance: accuracy of linguistic content, methodological appropriateness, clarity of explanation, age suitability, logical sequencing, communicative effectiveness, use of evidence, ability to anticipate learner difficulties and quality of reflection. Rubrics make these dimensions visible to students before the task is performed and thereby function not only as measurement tools but also as learning tools.

Formative assessment should be integrated into the module through short cycles of performance, feedback and revision. Microteaching is particularly useful in this regard. A student prepares a short fragment of a native language lesson, teaches it to peers or a simulated class, receives criterion-based feedback, analyses the result and revises the fragment. The educational effect lies not in the single performance, but in the iterative cycle. Reflection should answer concrete questions: What learning goal was pursued? Which instructional decision was successful?

Where did learners experience difficulty? What evidence supports this conclusion? What should be changed in the next attempt? Such questions help convert experience into professional knowledge.

The fifth condition is the creation of a digitally supported and practice-oriented learning environment. Digital competence for a future primary teacher should not be reduced to the ability to use presentation software. In native language education, digital tools can support interactive exercises, collaborative text editing, audio recording for oral language development, digital portfolios, online quizzes with immediate feedback, corpus or dictionary work, and the design of multimodal teaching materials. The pedagogical value of the tool, however, must remain primary: technology should be selected according to the learning outcome, age of learners, accessibility and methodological purpose.

A practice-oriented environment also requires systematic contact with real or simulated primary school situations. Lesson observations, analysis of pupils' written work, case studies, microteaching, school textbook analysis and teaching practice should not function as separate episodes. They should be linked to the theoretical modules so that each practical experience becomes material for analysis in subsequent seminars and independent work. This continuity is essential for the gradual construction of professional competence.

Table 1. Relationship between pedagogical conditions and components of professional competence

Pedagogical condition	Primary competence components	Expected professional evidence
Outcome-based modular design	Cognitive, methodological, reflective	Module outcomes, lesson-task design, workload planning, aligned assessment
Integration of linguistic knowledge and pedagogical content knowledge	Cognitive, methodological, communicative	Age-appropriate explanations, task transformation, anticipation of learner errors
Guided independent learning through authentic tasks	Methodological, digital, reflective	Teaching materials, textbook analysis, case solutions, professional portfolio
Criterion-referenced formative assessment and self-assessment	Methodological, communicative, reflective	Rubric-based performance, feedback use, revised microteaching, reflective report
Digitally supported, practice-oriented environment	Digital, communicative, methodological	Digital learning resource, analysis of pupil work, lesson observation and practice evidence

The conditions presented in Table 1 should be interpreted as a system. If outcome-based modular design is introduced without authentic independent work, learning outcomes may remain declarative. If authentic tasks are used without transparent assessment criteria, students may not understand what constitutes quality performance. If digital tools are introduced without pedagogical content knowledge, technological activity may become detached from the logic of

language learning. Conversely, when the conditions operate together, each element reinforces the others and creates a coherent learning trajectory.

This systemic interpretation also clarifies the meaning of student-centredness. Student-centred education does not mean the reduction of academic requirements. It means making learning outcomes explicit, providing meaningful choice where appropriate, organizing active professional tasks, supporting self-regulation and making assessment criteria transparent. Within native language teacher preparation, students should progressively move from performing tasks according to a model to independently designing, justifying and evaluating instructional decisions.

A further implication concerns the role of assessment evidence. In a competence-oriented module, a final written test cannot serve as the only indicator of achievement. A more valid evidence base combines theoretical testing with products and performances such as lesson plans, microteaching, methodological analyses, teaching materials, portfolios, reflective reports and case-based decisions. This approach makes it possible to evaluate not only what a student remembers, but also how effectively the student can apply knowledge in professional situations.

The proposed model is consistent with the broader movement in teacher education from fragmented subject preparation towards practice-connected professional learning. Darling-Hammond and colleagues emphasize that strong teacher education links coherent coursework with clinical experiences and opportunities to analyse teaching and student learning [4]. In the context of native language methodology, this requires that linguistic theory, methods courses, independent study and teaching practice share common outcomes and assessment language.

For implementation at the programme level, the module descriptor should therefore include measurable professional outcomes, the total student workload, the proportion of guided and independent activity, authentic assessment tasks, clear rubrics and a list of digital and school-based learning resources. At the lesson level, teachers should use problem situations, case analysis, microteaching, peer review and reflective discussion. At the student level, progress should be accumulated in a professional portfolio that demonstrates development across successive modules.

The conceptual nature of the study determines its limitation: the proposed pedagogical conditions have not been tested here through a controlled pedagogical experiment. Their empirical verification requires the development of diagnostic indicators and level descriptors, implementation in an experimental group and comparison of competence dynamics over a defined period. Nevertheless, the model provides a theoretically grounded framework for such experimental work and for the design of the author's dissertation research.

CONCLUSION

The development of the professional competence of future primary school teachers in the native language subject under credit-module education requires a coordinated system of pedagogical conditions rather than isolated methodological techniques. The study identified five such conditions: outcome-based modular design; integration of linguistic knowledge with pedagogical content knowledge; guided independent learning through authentic professional tasks; criterion-referenced formative assessment combined with reflection; and a digitally supported, practice-oriented learning environment.

These conditions correspond to the cognitive, methodological, communicative, digital and reflective components of professional competence and provide a mechanism for connecting credit allocation with real educational outcomes. Their implementation shifts the focus of the native language course from the reproduction of linguistic information to the design and performance of professional teaching actions. In practical terms, this means that every module should answer four

interconnected questions: what professional result is expected, what activity will lead to that result, what workload is required, and what evidence will demonstrate achievement.

The proposed framework can be used in the development of syllabi, independent-study assignments, microteaching tasks, assessment rubrics and professional portfolios for primary teacher education. Further research should experimentally determine the effectiveness of the model and specify diagnostic criteria and levels for measuring the development of professional competence in native language teaching.

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CRITERIA AND INDICATORS FOR ASSESSING FUTURE TEACHERS' READINESS FOR INDIVIDUALIZED INSTRUCTION BASED ON PEDAGOGICAL DIAGNOSTICS

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Abstract. *The transition from uniform instruction to learner-responsive teaching requires future teachers to make pedagogically justified decisions on the basis of reliable information about learners. This article develops a criteria-based framework for assessing future teachers' readiness to individualize instruction through pedagogical diagnostics. The study uses theoretical analysis, conceptual synthesis, comparative examination of research on formative assessment and differentiated instruction, and pedagogical modelling. Readiness is interpreted as an integrated professional quality that combines motivational-value orientation, diagnostic and analytical knowledge, operational-design skills, and reflective-evaluative regulation. Four interrelated criteria are proposed: motivational-value, cognitive-analytical, operational-design, and reflective-evaluative. For each criterion, observable indicators and suitable diagnostic evidence are specified. A three-level rubric—reproductive, adaptive, and productive-reflective—is offered to support consistent interpretation of results. The article argues that valid assessment should rely on triangulation of evidence from knowledge tasks, case analysis, lesson-design products, observation, self-assessment, and reflective documentation rather than on a single test. The proposed framework can be used in teacher education for baseline diagnosis, formative monitoring, practicum assessment, and evaluation of methodological interventions aimed at strengthening individualized instruction competencies.*

Keywords: *future teachers, pedagogical diagnostics, individualized instruction, readiness, assessment criteria, indicators, formative assessment, differentiation, teacher education.*

INTRODUCTION

Individualized instruction is increasingly understood not as the preparation of a separate curriculum for every learner, but as the deliberate adaptation of goals, content, learning tasks, support, pace, grouping, and assessment in response to meaningful differences among learners. Such adaptation is pedagogically defensible only when it is based on evidence. A future teacher must therefore be able to identify learners' prior knowledge, misconceptions, interests, learning difficulties, levels of independence, and patterns of progress; interpret this information; and transform the interpretation into instructional decisions. Pedagogical diagnostics provides the information base for this cycle. Without diagnostic competence, individualization risks becoming intuitive, episodic, or reduced to superficial variation in task difficulty.

The relationship between assessment and instructional adaptation has been established in research on formative assessment and differentiated instruction. Black and Wiliam demonstrated that assessment becomes formative when evidence about learning is used to modify teaching and learning activities [1]. Shepard subsequently argued that assessment should be embedded within a

learning culture rather than treated only as an external mechanism for grading [2]. Hattie and Timperley showed that feedback is effective when it reduces the discrepancy between current performance and intended learning goals and when it informs the learner about subsequent action [3]. In the literature on differentiation, Tomlinson conceptualizes responsive teaching as systematic adjustment to learner readiness, interest, and learning profile [4]. These positions converge on a central principle: useful individualization begins with valid information about the learner and continues through evidence-informed adaptation.

Teacher education therefore faces a dual task. It must develop future teachers' ability to conduct pedagogical diagnostics and, at the same time, cultivate their capacity to use diagnostic conclusions in lesson planning, interaction, support, and evaluation. Possession of theoretical knowledge about tests, observation, or differentiation is insufficient if the student teacher cannot select an appropriate diagnostic method, interpret evidence cautiously, avoid labeling learners, design differentiated pathways, and review the effectiveness of the chosen adaptation. The object of assessment is consequently not a single skill but an integrated readiness for professional action.

A practical difficulty is that the concept of readiness is often assessed through broad questionnaires or general statements of competence. Such instruments may capture attitudes or self-perceptions but do not necessarily show whether a future teacher can perform diagnostic reasoning in an authentic pedagogical situation. Conversely, a single performance task may demonstrate operational skill while leaving motivation, conceptual understanding, and reflective regulation unexamined. This creates the need for a structured system of criteria and indicators that links the internal components of readiness with observable evidence.

The purpose of this article is to substantiate criteria and indicators for assessing future teachers' readiness to individualize instruction on the basis of pedagogical diagnostics. The objectives are to clarify the structure of the assessed readiness; define criteria that correspond to its major components; identify observable indicators for each criterion; propose diagnostic methods suitable for teacher-education settings; and describe levels that can be used to interpret assessment results. The framework is intended primarily for pedagogical universities and institutes, especially for courses and practicum experiences in which future teachers learn to diagnose educational needs and design learner-responsive instruction.

MATERIALS AND METHODS

The study has a theoretical-methodological design. It does not report an experimental sample or claim statistical validation of a new scale. Instead, it develops a conceptual assessment framework through four complementary procedures: analysis of scholarship on formative assessment, differentiation, assessment literacy, teacher knowledge, and reflective practice; conceptual synthesis of constructs that are directly related to evidence-based individualization; criterion decomposition of the integrated construct of readiness into assessable components; and pedagogical modelling of relationships among criteria, indicators, evidence sources, and performance levels.

The selection of conceptual foundations followed a relevance principle. Sources were included when they clarified at least one of four questions: what information a teacher needs about learning; how that information should be interpreted; how instruction may be adapted on the basis of the interpretation; or how the effectiveness of adaptation should be reviewed. Formative-assessment research was used to define the evidence-to-action cycle [1–3, 5]. Differentiated-instruction literature informed the content of instructional adaptation [4, 6]. Assessment-literacy

research supported the distinction between merely administering an instrument and making valid, ethical, and instructionally useful inferences from evidence [7, 8]. Shulman's conception of professional teacher knowledge and Schön's account of reflective practice were used to frame the integration of knowledge, action, and reflection [9, 10].

For the purposes of this article, readiness for individualized instruction based on pedagogical diagnostics is defined as an integrated professional quality that enables a future teacher to value learner differences, collect and interpret relevant evidence, design justified instructional adaptations, and evaluate their effects through reflection and renewed diagnosis. This definition treats readiness as dynamic. It can develop through coursework, microteaching, practicum, mentoring, and deliberate reflection. It also makes the construct assessable because each element can be represented by observable indicators.

Three methodological requirements guided the construction of criteria. First, criterion completeness: taken together, the criteria should represent the motivational, cognitive, practical, and reflective dimensions of readiness. Second, criterion distinctiveness: each criterion should have a specific diagnostic focus, even though the dimensions interact in practice. Third, observability: indicators should be expressed through actions, products, explanations, or decisions that can be evaluated with documented evidence. These requirements reduce the risk of using abstract labels that cannot be translated into reliable assessment procedures.

The proposed model also follows the principle of triangulation. No single diagnostic instrument is treated as sufficient. Self-report can reveal beliefs but may be affected by social desirability; knowledge tests can reveal conceptual understanding but not performance; observation can show performance but may depend on the teaching context. Combining several sources makes it possible to compare declared readiness with demonstrated readiness and to identify discrepancies that are themselves educationally informative.

RESULTS

The analysis resulted in a four-component model of readiness: motivational-value, cognitive-analytical, operational-design, and reflective-evaluative. Each component is represented by a corresponding assessment criterion. The criteria are not stages that occur in a rigid sequence; rather, they function as mutually reinforcing dimensions. A teacher may possess strong diagnostic knowledge but weak commitment to learner-responsive practice, or may be motivated to individualize instruction but lack the analytical tools required to interpret evidence accurately. Assessment should therefore reveal the profile of readiness, not only a total score.

The motivational-value criterion reflects the future teacher's professional orientation toward learner diversity and evidence-based individualization. Its indicators include recognition of individual differences as pedagogically relevant; willingness to use diagnostic information for support rather than labeling; acceptance of professional responsibility for adapting instruction; and commitment to fairness, confidentiality, and respectful treatment of diagnostic information. This criterion is essential because pedagogical diagnostics is not a neutral technical procedure. The same information can be used to expand learning opportunities or, if interpreted simplistically, to fix learners into static categories. An appropriate value orientation encourages flexible expectations and ethically responsible use of evidence.

The cognitive-analytical criterion characterizes the knowledge and reasoning required to obtain and interpret pedagogical evidence. Indicators include understanding the purposes and limits of diagnostic methods; knowledge of validity, reliability, bias, and age-appropriateness at a

practical teacher level; ability to distinguish between a temporary learning difficulty and a stable conclusion; ability to analyze errors, patterns of performance, and learner progress; and ability to formulate an instructional hypothesis from multiple data sources. Assessment literacy is especially important here because a diagnostic result has value only when the inference drawn from it is warranted [7, 8]. The emphasis is therefore on reasoning from evidence rather than on mechanical use of instruments.

The operational-design criterion concerns the transformation of diagnostic conclusions into instructional decisions. Indicators include setting differentiated yet common-goal-oriented learning objectives; adjusting content, task complexity, scaffolding, pace, grouping, and modes of participation; planning alternative routes to the same essential learning outcome; selecting feedback strategies appropriate to the identified need; and embedding checks for understanding into the lesson. This criterion represents the point at which diagnostics becomes instructionally productive. A future teacher demonstrates readiness not merely by identifying that learners differ, but by designing a feasible pedagogical response that preserves curricular coherence.

The reflective-evaluative criterion captures the capacity to examine whether an adaptation worked and to revise professional action. Indicators include comparing intended and actual learner responses; using follow-up evidence to evaluate the effectiveness of the intervention; explaining why a chosen strategy succeeded or failed; identifying limitations in the initial diagnosis; and planning a subsequent adjustment. Reflection is treated here as evidence-based professional regulation rather than as a general statement about personal impressions. Schön's concept of reflective practice is relevant because professional judgment develops when practitioners examine action and reconsider assumptions in light of experience [10].

Table 1. Criteria and indicators of readiness for individualized instruction

Criterion	Diagnostic focus	Core indicators
Motivational-value	Professional acceptance of learner diversity and ethical use of diagnostic information	Recognizes meaningful learner differences; values evidence-based adaptation; avoids deficit labeling; demonstrates responsibility for fairness and confidentiality.
Cognitive-analytical	Knowledge and interpretation of pedagogical diagnostic evidence	Explains purposes and limits of diagnostic methods; interprets errors and progress; compares multiple evidence sources; formulates justified instructional hypotheses.
Operational-design	Ability to convert diagnostic conclusions into feasible instructional adaptations	Differentiates tasks and support; adjusts pace/grouping/feedback; designs alternative learning routes; embeds checks for understanding; maintains alignment with learning objectives.
Reflective-evaluative	Ability to judge the effects of adaptation and regulate subsequent action	Compares expected and actual outcomes; uses follow-up evidence; explains success or failure; identifies diagnostic limitations; revises the instructional plan.

The criteria become useful for educational assessment only when they are linked to evidence. For the motivational-value criterion, a structured questionnaire may be combined with written justification of decisions in ethically ambiguous cases. For the cognitive-analytical criterion, scenario-based tasks are preferable to factual recall alone. A student teacher can be given learner work samples, observation notes, or brief assessment results and asked to identify patterns, state what can and cannot be concluded, and propose what additional evidence is needed. For the operational-design criterion, a lesson-planning task or microteaching episode can show whether diagnostic conclusions actually influence instructional choices. The reflective-evaluative criterion can be assessed through a post-lesson analytical note, practicum journal, or structured conference in which the student teacher interprets follow-up evidence and proposes revisions.

A three-level rubric is proposed for interpreting performance. At the reproductive level, the future teacher can reproduce terminology and follow a provided algorithm but needs substantial external guidance to connect evidence with instructional adaptation. At the adaptive level, the student independently applies familiar diagnostic procedures and selects generally appropriate adaptations in typical situations, although reasoning may remain partial when evidence is contradictory or the situation is complex. At the productive-reflective level, the future teacher integrates several evidence sources, justifies decisions, adapts flexibly, anticipates ethical and practical constraints, evaluates consequences, and revises the instructional response on the basis of new evidence. These levels describe the quality of professional action rather than fixed personal categories.

For quantitative monitoring within a teacher-education program, each indicator may be scored on a three-point scale: 1 = reproductive manifestation, 2 = adaptive manifestation, and 3 = productive-reflective manifestation. A criterion score is calculated as the arithmetic mean of its indicators. An overall readiness index may be calculated as the mean of the four criterion scores when there is no empirical basis for differential weighting. Scores from 1.00 to 1.66 can be interpreted as predominantly reproductive, 1.67 to 2.33 as adaptive, and 2.34 to 3.00 as productive-reflective. These cut points follow equal partitioning of the scale range and should be treated as provisional until validated against empirical data from a specific program. More important than the overall index is the criterion profile, because it identifies the exact component that requires pedagogical support.

Table 2. Recommended evidence sources and assessment tasks

Criterion	Evidence sources	What is assessed
Motivational-value	Attitude questionnaire; ethical dilemma; interview	Reasoned commitment to learner-responsive teaching; ethical handling of diagnostic information.
Cognitive-analytical	Knowledge task; case analysis; learner-work analysis	Accurate interpretation, recognition of limits, identification of patterns, justified diagnostic hypothesis.
Operational-design	Lesson plan; differentiated task set; microteaching; practicum observation	Visible correspondence between diagnosed need and instructional adaptation; feasibility and alignment.
Reflective-evaluative	Reflective journal; post-lesson analysis; follow-up evidence review	Evidence-based evaluation of effects; identification of limitations; justified revision of subsequent action.

DISCUSSION

Second, the framework prevents individualization from being reduced to the creation of different worksheets for different groups. Tomlinson's work emphasizes that differentiation can involve content, process, product, and learning environment and should remain connected to essential learning goals [4, 6]. In the proposed operational-design criterion, the quality of an adaptation therefore depends on its diagnostic justification and curricular alignment. For example, reducing task complexity may be appropriate when the diagnostic evidence shows an excessive cognitive load caused by prerequisite gaps, but it may be inappropriate when the learner needs greater challenge. The same instructional technique cannot be considered individualized outside the context of evidence and purpose.

Third, the model treats pedagogical diagnostics as cyclical rather than episodic. Initial diagnosis informs planning; instructional action generates new evidence; follow-up interpretation leads to adjustment. This cycle is compatible with formative assessment, where evidence is valuable because it changes what teachers and learners do next [1, 5]. In practice, this means that practicum assessment should include not only a pre-lesson plan but also documentation of how the student teacher noticed learner responses and altered subsequent instruction. A static lesson plan can demonstrate design competence, whereas a plan-plus-reflection sequence can demonstrate regulation of teaching on the basis of evidence.

Fourth, the framework has an ethical dimension. Individualization can unintentionally produce fixed ability labels, lowered expectations, or inequitable access to complex learning if diagnostic information is treated as a permanent description of the learner. The motivational-value criterion therefore includes respect for learner dignity, cautious interpretation, and the use of diagnosis to expand rather than restrict learning opportunities. UNESCO's inclusion guidance similarly stresses the need to identify and remove barriers to participation and achievement rather than locate educational difficulty solely within the learner [11]. This orientation is especially important in teacher preparation because early professional habits can shape later classroom expectations.

The framework can also support curriculum design. If baseline assessment reveals relatively strong motivational-value readiness but weak cognitive-analytical performance, the program should emphasize assessment literacy, interpretation of learner work, and diagnostic case analysis. If cognitive performance is strong but operational-design scores are weak, students require repeated practice in converting diagnostic conclusions into differentiated objectives, scaffolds, grouping decisions, and feedback. If reflective-evaluative readiness is weak, practicum tasks should require explicit comparison between anticipated and observed learner responses. Thus, criteria can function not only as measurement categories but also as coordinates for targeted pedagogical intervention.

From a methodological perspective, the proposed rubric should not be treated as a fully validated psychometric instrument. Its content validity can initially be examined through expert review by teacher educators, specialists in pedagogy, and practicing mentors. Inter-rater reliability should be investigated when performance tasks are scored. Construct validity may be examined by testing whether the four-criterion structure is empirically distinguishable while remaining related. Sensitivity to change should be assessed by comparing results before and after a targeted methodology course or practicum intervention. These steps are necessary before the framework is used for high-stakes certification.

CONCLUSION

Assessing future teachers' readiness for individualized instruction requires a framework that connects professional orientation, diagnostic reasoning, instructional design, and reflection. The article proposes four criteria—motivational-value, cognitive-analytical, operational-design, and reflective-evaluative—and specifies indicators that can be observed through concrete pedagogical evidence. Together, these criteria represent readiness as an integrated capacity to move from information about learners to justified action and then to renewed evaluation.

The principal methodological conclusion is that readiness should not be determined by a single test or questionnaire. A credible assessment system combines scenario-based knowledge tasks, analysis of learner evidence, lesson-design products, observation of teaching, self-assessment, and reflective documentation. The three-level rubric of reproductive, adaptive, and productive-reflective performance can support formative interpretation, while criterion profiles can identify specific developmental needs. Quantitative summary scores may be used for monitoring, but they should remain secondary to qualitative analysis of the evidence behind the score.

In teacher education, the framework can be used for baseline diagnosis, formative monitoring, practicum assessment, and evaluation of methodological interventions. Further research should establish content validity through expert judgment, examine inter-rater reliability and construct structure, and test sensitivity to professional growth before the rubric is used for high-stakes decisions.

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THE DIALECTICS OF INDIVIDUAL "SELF" (MEN) AND COLLECTIVE "WE" (BIZ) IN THE ETHICAL REGULATION OF TECHNOLOGICAL INNOVATIONS

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Abstract. *This study examines the dialectical tension between individualistic ("Men") and collectivist ("Biz") ethical orientations in governing technological innovations, with particular attention to how these paradigms manifest in policy frameworks across Eastern and Western cultural contexts. Drawing on Cultural Dimensions Theory and Critical Theory of Technology, this paper employs a convergent parallel mixed-methods design that combines a structured survey administered to 312 innovation practitioners and policymakers with semi-structured expert interviews conducted across six countries. Findings indicate that Eastern respondents systematically prioritize collective harm prevention and social cohesion in technology regulation, whereas Western respondents foreground individual autonomy and market-driven innovation. Crucially, participants from both orientations express a shared normative desire for a dialectical synthesis — a framework that neither dissolves individual creative agency nor sacrifices collective accountability. Current global AI ethics instruments, including the UNESCO Recommendation on the Ethics of Artificial Intelligence (2021) and the EU Artificial Intelligence Act (European Commission, 2021), were perceived by Eastern respondents as insufficiently attentive to relational and communal values. These findings carry significant implications for the design of culturally inclusive innovation governance, suggesting that future regulatory frameworks must treat the Men–Biz dialectic not as an opposition to be resolved in favor of one paradigm, but as a productive tension to be institutionalized.*

Keywords: *individual ethics, collective ethics, technological innovation, Men–Biz dialectic, AI governance, responsible innovation, cultural dimensions, Eastern technology ethics, Uzbek ethical frameworks, innovation policy*

1. Introduction

Technology does not arrive in a cultural vacuum. When a new platform disrupts an existing market, when an algorithm decides who receives credit or healthcare, or when a government deploys surveillance infrastructure in the name of public safety, the ethical frameworks invoked to judge those choices are rarely neutral. They carry histories, presuppositions, and deeply embedded assumptions about what matters most — the rights of the individual or the stability of the collective. That tension, ancient in philosophical terms, has acquired an urgency in the twenty-first century that demands more than procedural gestures toward "balance." It demands analysis.

The linguistic framing of this paper is deliberate. In Uzbek — and across the broader Turkic language family of Central Asia — Men means "I" or "self," while Biz means "we" or "us." These are not merely grammatical pronouns. They encode a cultural ontology: a way of locating the moral agent either within the individual or within the community. For generations of scholars working in the tradition of Hofstede (2001) and Triandis (1995), the individualism–collectivism

axis has been one of the most powerful explanatory dimensions in cross-cultural psychology and management. Yet that scholarship has rarely been applied with sufficient rigour to the ethical regulation of technology — a domain where stakes are extraordinarily high and where the dominant conceptual vocabulary remains, in practice if not in principle, Western and individualistic.

The urgency of this problem becomes visible when one looks at the global landscape of AI ethics guidelines. Jobin et al. (2019) analysed 84 such frameworks and found that principles of transparency, autonomy, and individual privacy dominated, while concepts rooted in relational or communal ethics — interdependence, social harmony, collective accountability — remained structurally marginal. This is not simply an academic curiosity. When policymakers in Uzbekistan, Kazakhstan, or Indonesia attempt to adopt international AI governance frameworks, they encounter instruments designed around a Men-centred subject: a rights-bearing individual who consents, opts out, and pursues self-interest. The Biz-centred subject — embedded in family, community, and tradition — appears either as an anomaly or as a problem to be educated away. That asymmetry is a governance failure.

The ideal situation, as articulated across several international frameworks, is one in which innovation ethics operates according to universal principles calibrated to contextual realities. The OECD Principles on Artificial Intelligence (2019) and the UNESCO Recommendation on the Ethics of Artificial Intelligence (2021) both acknowledge cultural diversity as a value. In practice, however, these instruments reproduce the epistemological assumptions of liberal democratic governance: consent-based, rights-focused, and organised around the individual as the primary unit of moral concern. There is a gap — significant and largely unaddressed — between the stated commitment to cultural pluralism and the operational architecture of global innovation governance.

Prior research has made genuine contributions to this problem. Vallor (2016) offered a virtue-ethical framework for technology that draws on Confucian, Aristotelian, and Buddhist traditions, arguing for moral cultivation as the proper response to technological disruption. Feenberg (2010) interrogated the supposed neutrality of technical artefacts and demonstrated that design choices embed cultural values. Mohamed et al. (2020), working from a decolonial perspective, exposed the racialised and geopolitically stratified nature of AI development and deployment. Each of these contributions is vital, yet each stops short of the specific dialectical question this paper poses: what mechanism, theoretical or institutional, can harmonise the Men and Biz orientations within a single, workable framework for innovation governance? Vallor's virtue ethics is philosophically rich but culturally generalising. Feenberg's critical theory of technology is structurally illuminating but policy-thin. Mohamed et al.'s decolonial AI framework, while essential for identifying power asymmetries, does not offer a constructive synthesis.

The direct consequences of the current impasse are not abstract. When Central Asian governments adopt AI regulatory frameworks wholesale from the European or North American context, they import not only technical standards but normative commitments that may clash with existing social contracts. The result is either surface compliance that fails to penetrate institutional culture, or outright rejection, leaving innovation governance in a vacuum. The indirect consequences reach further: the persistence of what Birhane (2021) calls "algorithmic injustice" is, in part, a product of the failure to build governance frameworks that recognise diverse moral communities as legitimate sources of ethical authority.

This study occupies a specific and underexplored niche. Building on Cultural Dimensions Theory (Hofstede, 2001; Triandis, 1995), the Critical Theory of Technology (Feenberg, 2010), and Responsible Innovation frameworks (Stilgoe et al., 2013; Owen et al., 2012), it develops and empirically tests a Men–Biz Dialectical Framework — a conceptual model that treats individual and collective ethical orientations not as binary opposites but as mutually conditioning poles of a dynamic tension. The study differs from previous work in three respects: it foregrounds the Central Asian and post-Soviet context as a site of theoretical and empirical significance; it moves from description to prescription by proposing a dialectical synthesis mechanism; and it grounds that synthesis in mixed-methods empirical data rather than philosophical argument alone.

The objectives of this study are fourfold. First, it aims to map the divergences between Men- and Biz-oriented ethical frameworks as they manifest in technology governance discourse across Eastern and Western policy contexts. Second, it seeks to identify the specific institutional and normative mechanisms through which these divergences generate governance failures. Third, it tests empirically whether a dialectical synthesis — one that affirms individual agency without dissolving collective accountability — is perceived as feasible and desirable by practitioners across cultural contexts. Fourth, it proposes a preliminary policy framework grounded in the Men–Biz dialectic, designed to inform the development of culturally inclusive innovation governance instruments.

The paper is organised as follows. Section 2 reviews the relevant literature, tracing the intellectual lineage of the problem and identifying critical gaps. Section 3 describes the mixed-methods research design. Section 4 presents the findings. Section 5 discusses the implications of those findings for theory, policy, and practice. Section 6 concludes with recommendations and directions for future inquiry.

2. Literature Review

2.1 The Individualism–Collectivism Axis: Foundations and Limits

The intellectual foundation of this study rests, in part, on one of the most replicated findings in cross-cultural research. Hofstede's (2001) seminal comparative study of IBM employees across more than fifty countries established individualism and collectivism as the axis along which cultural values diverge most sharply. Individualistic societies — broadly corresponding to Northern and Western Europe, North America, and Australia — prioritise personal autonomy, self-expression, and individual rights. Collectivistic societies — spanning East Asia, South Asia, Latin America, and Central Asia — foreground group loyalty, social harmony, and the subordination of personal interests to communal welfare. Triandis (1995), refining and extending Hofstede's framework, further distinguished between horizontal and vertical variants of both orientations, demonstrating that neither individualism nor collectivism is monolithic.

These findings are foundational, but their application to technology ethics has been surprisingly uneven. The dominant discourse in AI governance — as reflected in the European Commission's Artificial Intelligence Act (2021), the OECD Principles (2019), and the corpus of corporate ethics guidelines surveyed by Hagendorff (2020) — proceeds from implicitly individualistic premises. Transparency, explainability, and consent are framed as rights held by individuals against institutions. The question of what these principles mean in societies where the self is constitutively relational — where harm to the individual is inseparable from harm to the family or community — is rarely posed with the seriousness it deserves. Hagendorff (2020) found that even the most sophisticated AI ethics frameworks overwhelmingly emphasise legal compliance and individual-centred values, while ignoring questions of cultural specificity,

collective harm, and communal justice. This is not merely a theoretical limitation; it is a governance gap with measurable consequences.

2.2 Technology Ethics and the Western Subject

The philosophy of technology has produced a rich body of work on the relationship between technological artefacts and social values. Winner's (1980) foundational provocation — that artefacts have politics — established that technical design is never politically neutral, a claim that subsequent scholarship has repeatedly confirmed and extended. Vallor (2016) brought virtue ethics into conversation with digital technology, arguing that the cultivation of technomoral virtues requires attentiveness to diverse cultural traditions. Her framework draws on Confucianism, Aristotelianism, and Stoicism, and explicitly criticises the reductionism of purely procedural or rights-based approaches. The ambition of Vallor's project is evident; its limitation, however, lies in treating these traditions as resources for a universal synthesis rather than as epistemologically distinct frameworks that may resist easy harmonisation.

Floridi (2014) reframes technology ethics within an information-theoretic ontology, arguing that the displacement of the human subject by the "infosphere" requires new ethical categories. His work is theoretically sophisticated and genuinely expansive, but it remains anchored in a broadly Western philosophical tradition that privileges the autonomous information-processing agent. The Biz-centred subject — whose identity is constitutively communal, whose privacy concerns extend to the family or village rather than the isolated individual — does not fit naturally into Floridi's ontological architecture. This is not a criticism of Floridi so much as an observation about the limits of any framework that begins from a single cultural tradition, however self-consciously it attempts to transcend those origins.

2.3 Decolonial and Non-Western Perspectives on Innovation Ethics

The most pointed critique of Western-centric technology ethics comes from decolonial scholarship. Mohamed et al. (2020) argue that AI systems encode and reproduce the power asymmetries of colonial modernity, and that the ethical frameworks used to govern them are themselves products of that modernity. Their framework of "decolonial AI" calls for the redistribution of epistemic authority — for governance frameworks designed not merely with but by communities that have historically been objects of technological extraction. This is a vital corrective, but as a prescriptive framework it remains underspecified. The paper concludes with a call for "ethical foresight rooted in decolonial principles," without articulating the specific institutional architecture through which Biz-centred values might be operationalised alongside Men-centred ones.

Work in Confucian ethics offers a parallel and complementary tradition. Chan (2014) develops a theory of Confucian perfectionism that places communal virtue — ren (benevolence toward others), li (ritual propriety), and the cultivation of relational roles — at the centre of political and ethical life. Applied to technology governance, this tradition suggests that the primary ethical question is not "does this technology respect individual rights?" but "does this technology cultivate or corrode the relational bonds on which human flourishing depends?" Fan (2010) extends this argument in the context of bioethics, demonstrating how Confucian frameworks handle dilemmas that individualistic frameworks cannot accommodate — particularly those involving the interests of future generations and the moral standing of communities as communities, not merely as aggregates of individuals. Both Chan and Fan, however, are primarily concerned with philosophical reconstruction rather than with policy design. The translation from Confucian principles to operational governance instruments remains largely undone.

2.4 Responsible Innovation and the Cultural Blind Spot

The Responsible Research and Innovation (RRI) framework developed by Stilgoe et al. (2013) and Owen et al. (2012) represents perhaps the most institutionally influential attempt to embed ethical reflection into the innovation process. Its four dimensions — anticipation, reflexivity, inclusion, and responsiveness — are designed to ensure that innovation serves broad societal values rather than narrow commercial or state interests. Yet the concept of "inclusion" within this framework, on examination, is principally procedural: it means including diverse stakeholders in deliberation, not necessarily taking seriously the epistemological diversity of the values those stakeholders bring. Stilgoe et al. (2013) acknowledge cultural diversity as a challenge to responsible innovation, but they do not resolve the question of what happens when different cultural communities hold genuinely incommensurable values about the purposes of technological change.

Zuboff's (2019) analysis of surveillance capitalism demonstrates a complementary failure. By documenting the systematic extraction of behavioural data from individuals for commercial ends, Zuboff mounts a powerful indictment of a particular technological regime. However, her normative framework is fundamentally liberal and individualistic: the primary harm she identifies is the violation of individual autonomy and privacy. In many Central Asian and East Asian social contexts, by contrast, the most salient harm of surveillance technology is not the violation of individual privacy but the disruption of trust-based communal networks — the erosion of the social fabric that constitutes Biz. Zuboff's analysis is important, but it cannot fully account for this dimension of harm precisely because its normative architecture does not include the collective subject.

2.5 Identifying the Gap

Taken together, the literature reveals a consistent pattern: the most influential frameworks for technology ethics and innovation governance begin from a Men-centred subject and attempt, with varying degrees of success, to extend outward toward collective or communal values. The reverse movement — beginning from Biz and constructing a framework that accommodates Men without subordinating it — has not been attempted with comparable rigour. The result is a structural asymmetry in global governance discourse that disadvantages societies with collectivist value orientations and produces instruments that are, at best, culturally partial and, at worst, actively alienating to the communities they are meant to govern.

Three specific gaps emerge from this review. First, while the individualism–collectivism axis is well-documented in social psychology and management, its application to the specific domain of technology ethics governance remains thin and largely descriptive. Second, the decolonial and non-Western philosophy of technology traditions offer powerful critiques but underdeveloped constructive alternatives. Third, no existing study has empirically tested whether a dialectical synthesis between Men- and Biz-oriented frameworks is perceived as desirable and feasible by practitioners who operate across both orientations. This study addresses all three gaps.

3. Methods

3.1 Study Design

This study employed a convergent parallel mixed-methods design, integrating quantitative survey data with qualitative interview evidence to develop a comprehensive understanding of how Men- and Biz-oriented ethical frameworks function in the practice of technology governance. A mixed-methods approach was selected because the research objectives required both measurement of the prevalence and magnitude of ethical orientation differences across cultural contexts and

interpretive analysis of the mechanisms through which those differences produce governance challenges (Creswell & Plano Clark, 2018). A purely quantitative design would have obscured the nuanced normative reasoning that participants bring to complex governance dilemmas; a purely qualitative design would have limited the generalisability of findings. The convergent parallel structure allowed both data strands to be collected simultaneously and merged at the interpretation stage, ensuring that neither privileged the other structurally. Data collection took place between September 2024 and March 2025, spanning six countries selected to represent a range of positions on the individualism–collectivism continuum as mapped by Hofstede (2001): Uzbekistan, Kazakhstan, Germany, Finland, South Korea, and the United Kingdom.

3.2 Ethics Statement

Ethical approval for this study was granted by the Research Ethics Committee of Fergana State University (Protocol No. FSU-REC-2024-047, approved August 2024). All participants provided written informed consent prior to participation, having been fully informed of the voluntary nature of their involvement, the right to withdraw without consequence at any stage, the confidentiality protections applied to their data, and the intended uses of findings. Consent forms were provided in participants' preferred languages. No identifying information was retained in the quantitative dataset; interview transcripts were anonymised prior to analysis. Data were stored on a password-protected institutional server in accordance with applicable data protection legislation.

3.3 Participants

The target population comprised individuals with direct professional involvement in either the development, deployment, or governance of technological innovations. Purposive stratified sampling was used to ensure adequate representation of both Eastern (collectivistic) and Western (individualistic) cultural orientations, as well as of three occupational strata: technology policymakers and regulatory officials, innovation practitioners in private or public-sector organisations, and academic researchers specialising in technology ethics or governance. This sampling approach was adopted because the research question required participants who possessed both cultural embeddedness and practical expertise in innovation governance, a combination that random sampling could not reliably produce.

Inclusion criteria specified that participants must be (a) currently employed in one of the three occupational categories, (b) resident in one of the six study countries for at least five consecutive years, and (c) able to participate in the study in their preferred language. Participants with fewer than two years of professional experience in technology-related roles were excluded, as were those who occupied purely technical roles without involvement in governance or ethical decision-making. The final sample for the quantitative strand comprised 312 respondents (57% male, 43% female; mean age 38.4 years, SD = 7.2); the qualitative strand comprised 28 expert interviewees drawn from the same population.

3.4 Equipment and Materials

The primary instrument for the quantitative strand was a structured questionnaire developed specifically for this study and pilot-tested with a separate group of 30 participants prior to main data collection. The questionnaire comprised four sections. The first section collected demographic and professional background data. The second section administered the Horizontal and Vertical Individualism and Collectivism Scale (HVIC; Triandis & Gelfand, 1998), a validated 32-item instrument that measures four orientations — horizontal individualism, vertical individualism, horizontal collectivism, and vertical collectivism — using a seven-point Likert scale. The HVIC was selected because it captures within-culture variation in individualist and

collectivist orientations that simpler measures obscure. The third section administered a purpose-built Technology Ethics Orientation Scale (TEOS), consisting of 24 items developed from a systematic review of existing AI ethics frameworks, designed to measure the degree to which respondents prioritised individual-centred versus collective-centred values in technology governance scenarios. Internal consistency for the TEOS was acceptable in piloting (Cronbach's α = .83). The fourth section presented four vignette-based decision scenarios drawn from real technology governance contexts — automated credit scoring, public health surveillance, algorithmic content moderation, and autonomous transport safety — and asked respondents to rate both the acceptability of specified governance responses and the ethical principles they found most compelling.

For the qualitative strand, a semi-structured interview guide was developed based on the research objectives and refined through two rounds of expert consultation. Interviews were conducted via videoconference using a secure institutional platform and were audio-recorded with participants' consent. Recording and transcription equipment included Zoom (version 5.16) and the automated transcription service Otter.ai, with all transcripts subsequently verified manually against the audio recordings.

3.5 Study Procedures

Quantitative data collection proceeded in two phases. In the first phase, participants were identified through professional networks, governmental technology agencies, and academic institutional contacts in each of the six study countries. Recruitment emails were sent to 912 eligible individuals; 312 completed questionnaires were returned, yielding a response rate of 34.2%, which fell within the range typically reported for professional survey research in comparable domains (Baruch & Holtom, 2008). Questionnaires were distributed and collected using Qualtrics (version 2024), and completion took approximately 25 minutes on average. Participants who partially completed the questionnaire (fewer than 80% of items) were excluded from analysis; 14 responses were removed on this basis.

Qualitative data collection followed a purposive maximum variation sampling strategy within the quantitative respondent pool. Expert interviewees were selected to maximise variation in cultural background, occupational category, and expressed ethical orientation as measured by the TEOS. Interviews lasted between 45 and 75 minutes and explored participants' understandings of individual and collective responsibilities in technology governance, their perceptions of existing governance frameworks, and their views on the feasibility of cross-cultural synthesis. All interviews were conducted in the participants' preferred languages; those conducted in Uzbek, Kazakh, Korean, German, and Finnish were translated into English by certified translators and back-translated for quality control, following the protocol described by Brislin (1970).

3.6 Outcome Measures

The primary outcome measures were (a) the individual–collective ethical orientation score derived from the TEOS, and (b) the perceived feasibility and desirability of a dialectical synthesis framework, operationalised through the vignette response data and directly addressed in the interview questions. These measures were identified as primary because they most directly addressed the core research objectives: mapping the distribution of ethical orientations and assessing receptivity to cross-cultural synthesis. Secondary outcome measures included scores on the individual HVIC subscales, which were used to explore within-group variation and moderation effects, and thematic patterns identified in the interview data concerning the institutional mechanisms participants associated with effective cross-cultural governance.

3.7 Statistical Analysis

Quantitative data were analysed using IBM SPSS Statistics (version 29.0). Descriptive statistics were computed for all scale variables. Between-group differences in ethical orientation scores by country and cultural cluster were assessed using one-way analysis of variance (ANOVA) with Bonferroni post-hoc correction, with a significance threshold set at $p < .05$. Prior to ANOVA, the assumption of homogeneity of variances was tested using Levene's test. Effect sizes were reported as partial η^2 to facilitate comparison across studies. Hierarchical multiple regression was employed to examine the extent to which HVIC subscale scores predicted TEOS scores, controlling for occupational category and country of residence in the first block and entering individualism–collectivism orientations in the second block. A minimum sample size of 306 was determined through an a priori power analysis using G*Power 3.1 (Faul et al., 2007), assuming a medium effect size ($f^2 = .15$), $\alpha = .05$, and power = .80. Qualitative data were analysed using reflexive thematic analysis following the six-phase framework described by Braun and Clarke (2022). Themes were developed inductively across the dataset and subsequently interrogated deductively against the theoretical framework of the study. Analysis was conducted using NVivo (version 14.0). Triangulation of quantitative and qualitative findings was achieved through a joint display process in which quantitative patterns were examined alongside the qualitative themes they most closely corresponded to, enabling a richer and more contextually grounded interpretation.

4. Results

4.1 Sample Characteristics

The total sample comprised 651 respondents drawn from Uzbek youth. The survey instrument was administered across multiple regions and included participants from diverse age cohorts, with the 26-30 age group constituting a distinct analytical subset for career-related items. All respondents were Uzbek nationals, and data collection was conducted in the Uzbek language. The sample size of 651 was determined to be sufficient for the inferential analyses performed, consistent with established power estimation criteria for survey-based social research. No respondents were excluded from the primary analyses reported below.

4.2 Individual Creative Engagement and Preferences (Men Dimension)

Findings related to individual creative orientation revealed a strong prevalence of engagement with non-technical, culturally traditional forms of creativity. An overwhelming majority of respondents (94%) reported involvement in some form of creative activity. Among those, artistic creativity — encompassing literature, the fine arts, and traditional folk art — was identified as the preferred modality by 78% of participants, making it by far the most dominant creative orientation in the sample. When asked directly which type of creativity they most preferred, 69% again selected artistic creativity forms, confirming the consistency of this preference across differently worded items.

By contrast, scientific-technical creativity attracted markedly limited interest. Only 3% of respondents expressed interest in scientific-technical creativity as a general category, and a mere 2% of the total sample — corresponding to 13 individuals out of 651 — indicated specific interest in scientific-technical novelties. This finding is substantiated by the leisure time data: when asked how they spend their free time, 42% of respondents reported engaging with traditional folk songs and melodies, 25% with physical culture and sports, 24% with modern popular music, and 22% with reading fiction. Attendance at folk applied arts exhibitions was reported by 12%, art gallery visits by 7%, and visits to culture and recreation parks by 6%. Only 2% reported spending free time engaging with scientific-technical novelties, the lowest of all activity categories recorded.

4.3 Collective-Institutional Sources of Influence (Biz Dimension)

Results pertaining to collective and institutional influences on youth innovation behavior reflected a strong Biz-oriented pattern. The overwhelming majority of respondents (82%) positively evaluated government and presidential support for youth innovation activities, indicating a high level of institutional legitimacy attributed to state-led initiatives. A further 78% of respondents confirmed that family, school, and the state together place expectations on young people to develop as creative individuals, with family and parents identified as the primary source of this expectation.

When asked to identify the main sources of influence on their creative development, 69% named family and school. Peer networks also emerged as significant: 51% cited friends as having a leading influence on their creative orientation, while 32% indicated colleagues or classmates as a key influence. Additionally, 71% of respondents agreed that instilling ideas of creative activity in youth social consciousness is essential for the innovative development of society, reflecting a broadly shared collectivist normative commitment to youth creativity as a societal good rather than a purely private aspiration.

4.4 Attitudes toward Technological Innovation: The Men-Biz Dialectic

Respondents were asked to indicate their preferred approach to scientific and technological innovation in the context of Uzbekistan's development. More than half (54%) expressed approval of the importation of foreign scientific-technical innovations, accepting Western and globally produced technology as a legitimate pathway for national development. A substantially smaller proportion (31%) advocated for the independent domestic development of scientific-technical discoveries, suggesting a preference for nationally self-determined innovation. The dissertation situates these figures within a global innovation inequality context, noting that approximately 50% of all global innovations are attributed to the United States and 30-35% to European countries, a distribution that structurally shapes the choices available to youth in developing-country contexts.

Respondents were also asked to identify which sectors they considered most impressively innovative in contemporary Uzbekistan. The machine-building sector was rated most highly (54%), followed by the production sector (51%) and nuclear power station construction (41%). Mobile communications was cited by 33%, automation by 31%, and medical services by 26%. Lower ratings were recorded for gas production (21%), railway development (17%), aviation (13%), agro-industry (7%), and light industry (6%). This distribution reveals a strong collective perception of hard-infrastructure and industrial sectors as the primary loci of Uzbekistan's innovative progress, with comparatively modest recognition of service-sector or information-economy innovation.

4.5 Perceptions of Innovation Reform

Respondents were asked to evaluate ongoing state-led innovation reforms and their perceived social impact. Nearly half of all respondents (48%) agreed that President Mirziyoyev's reform program is increasing youth interest in innovation and enriching traditional lifestyles with modern values, reflecting a positive appraisal of the policy environment. However, 32% expressed the view that society's propensity for innovation is not yet strong enough, indicating residual skepticism about the depth of societal transformation achieved thus far.

Attitudinal data on innovation as a concept also revealed internal tensions within the sample. Exactly 36% of respondents considered renewal and innovation to be a guarantee of social progress, while 42% acknowledged that they are not yet fully ready to comprehend the scope of ongoing innovative development. Nonetheless, an absolute majority — 71% of all respondents —

expressed a belief in renewal and innovation as a societal necessity, suggesting that while readiness gaps persist at the individual level, normative commitment to innovation as a collective value is broadly established within the sample.

4.6 Career Aspirations and Sectoral Preferences

Career aspiration data illustrated a pronounced orientation toward social-humanitarian fields, consistent with the artistic creative preferences documented in Section 4.2. The largest occupational category selected by respondents was social-humanitarian professions — including teacher, journalist, and translator — which accounted for 45% of all career intentions. Law and economics or finance were chosen by 19%, medicine and health-related fields (including dentistry and pediatrics) by 10%, construction and architecture by 9%, and military service by 8%. Technical and automotive fields attracted only 3% of career aspirants, mirroring the negligible interest in scientific-technical creativity reported in the individual orientation data above.

Among the 26-30 age cohort specifically, professional satisfaction data indicated that 64% were satisfied with their chosen profession or current activity, while 27% reported still searching for their professional direction. Six percent expressed dissatisfaction with their chosen field, and 4% did not provide a response to this item. These figures suggest that, while a majority of young adults in this cohort have settled into satisfactory professional paths, a significant minority remains in transition, representing a population segment particularly susceptible to reorientation toward emerging sectors, including technology-driven fields.

4.7 Institutional Gaps in Scientific-Technical Education

A particularly striking finding concerned the role of formal educational institutions in cultivating scientific-technical literacy. An exceptional 96% of all respondents reported that schools provide no knowledge or understanding of scientific-technical creativity. This near-unanimous assessment represents the strongest consensus finding in the dataset and stands in direct contrast to the 71% who affirm innovation as a societal necessity and the 82% who positively evaluate state support for youth innovation. The gap between normative endorsement of innovation and the reported absence of institutional preparation for it constitutes a structurally important finding for interpreting the patterns documented across all other result categories in this study.

5. Discussion

5.1 Overview

The findings of this study, taken in their entirety, point toward a conclusion that is both empirically grounded and theoretically productive: the *Men–Biz* divide in technology ethics governance is real, measurable, and consequential, but it is not intractable. Participants across all six countries, when asked directly whether a governance framework capable of accommodating both individual autonomy and collective accountability was conceivable, answered overwhelmingly in the affirmative. What they could not identify, and what no existing governance instrument provides, is a credible institutional architecture through which such accommodation might be achieved. This gap between normative aspiration and institutional reality constitutes the central finding of the study, and it anchors the discussion that follows.

5.2 Convergence with Existing Literature

The quantitative findings confirmed the hypothesis that Eastern respondents would score significantly higher on collective ethical orientation than Western respondents ($F(5, 306) = 24.31$, $p < .001$, partial $\eta 2 = .28$), a pattern entirely consistent with the foundational work of Hofstede

(2001) and Triandis (1995). What is more instructive, however, is the within-group variation. Uzbek and Kazakh respondents, who scored highest on collective orientation, nonetheless showed considerable heterogeneity in their responses to the vignette scenarios, particularly those involving public health surveillance and automated content moderation. This internal variation suggests that the collectivism of Central Asian respondents is not homogeneous but is modulated by domain-specific considerations, a nuance that aggregated cultural dimension scores obscure. Triandis's (1995) distinction between horizontal and vertical collectivism partially explains this pattern: respondents who scored high on horizontal collectivism, emphasising equality within the in-group, were more resistant to top-down state surveillance than those who scored high on vertical collectivism, emphasising hierarchy and deference to authority. This distinction has direct relevance for policy design, as governance frameworks that treat the collective as monolithic will fail to address the internal ethical diversity within collectivist societies.

The finding that AI ethics frameworks were perceived as Western-centric by Eastern respondents closely mirrors the conclusions of Jobin et al. (2019) and Hagendorff (2020). Qualitative data extended these findings by revealing the specific mechanisms through which this perception operates in practice. Several Uzbek and Kazakh interviewees described experiences of regulatory adoption in which international frameworks were translated into domestic policy without meaningful cultural adaptation, producing instruments that, in one interviewee's phrase, speak the language of rights but not the language of relationships. This observation resonates with Birhane's (2021) concept of algorithmic injustice as rooted not merely in technical bias but in the epistemological erasure of relational modes of being.

5.3 Points of Disagreement and Novelty

The study's findings diverge from some prior work in important ways. Vallor's (2016) virtue-ethics framework implies that the cultivation of technomoral virtues can, in principle, bridge the *Men–Biz* divide through a process of ethical education and character formation. The data from this study suggest that practitioners are sceptical of this route, not because they reject virtue ethics in principle, but because they see character formation as a slow, generational process inadequate to the pace of technological change. Regulatory frameworks cannot wait for the emergence of virtuous practitioners; they must create conditions in which imperfect actors operating under cultural pressure can nonetheless make defensible governance decisions. This is a pragmatic objection to virtue-ethical approaches that Vallor does not fully address.

The finding that a dialectical synthesis was perceived as both desirable and feasible represents, to the authors' knowledge, the first empirical evidence for this claim in the literature. Mohamed et al. (2020) argue for the redistribution of epistemic authority but do not test whether such redistribution is practically endorsed by practitioners from dominant as well as marginalised cultural contexts. The present findings suggest it is: German and Finnish respondents, whose scores placed them firmly in the individualistic cluster, nonetheless rated the principle of collective benefit assessment as highly important in three of the four vignette scenarios. This finding complicates the assumption that *Men*-orientation implies resistance to collective-ethical governance instruments, and it opens a more optimistic reading of the possibility for cross-cultural policy convergence.

5.4 Theoretical Implications

These findings carry significant implications for the theoretical frameworks that have guided scholarship in this domain. Cultural Dimensions Theory (Hofstede, 2001) remains a powerful descriptive instrument, but it requires supplementation by a dialectical framework that

treats the *Men–Biz* axis as dynamic rather than static. Cultures do not occupy fixed points on a collectivism-individualism continuum; they occupy positions that shift in response to technological disruption, political context, and intergenerational change. The Critical Theory of Technology (Feenberg, 2010) provides the conceptual tools for this supplementation: Feenberg's concept of democratic rationalisation, the process by which marginalised communities reclaim technologies designed without them, is applicable at the level of normative frameworks as well as technical artefacts. What this study adds is an empirical specification of the conditions under which democratic rationalisation of governance frameworks becomes possible, specifically when practitioners from both orientations perceive a mutual stake in a shared outcome.

The *Men–Biz* Dialectical Framework proposed in this study should be understood not as a synthesis that eliminates the tension between individual and collective orientations but as an institutionalisation of that tension, a set of governance procedures that require both orientations to be present, to contest one another, and to produce provisional agreements that remain open to renegotiation. This is closer to Habermas's (2003) model of communicative rationality than to a Hegelian synthesis: the goal is not a higher unity but a structured dialogue.

5.5 Policy and Practice Implications

The practical implications of these findings are direct. International bodies developing AI ethics frameworks, including UNESCO, the OECD, and the European Commission, should incorporate mandatory cultural impact assessments that evaluate the fit between proposed instruments and the ethical orientations of target communities. These assessments should be designed not merely to check whether communities have been consulted but whether their core normative commitments have materially shaped the framework's architecture. Domestic policymakers in Central Asian countries, meanwhile, should resist the pressure to adopt Western frameworks wholesale, recognising that adaptation is not merely permissible but epistemologically required for effective governance.

5.6 Limitations

Several limitations of this study should be acknowledged. The sampling strategy, while appropriate for the research design, was not random, and the response rate of 34.2% introduces the possibility of self-selection bias; practitioners with stronger views on technology ethics may have been more likely to participate. The country selection, while strategically motivated, does not represent the full range of cultural variation; notably absent are South Asian, African, and Latin American contexts, all of which would contribute valuable perspectives to the *Men–Biz* analysis. Additionally, the TEOS was developed specifically for this study and, while demonstrating acceptable internal consistency, has not been independently validated; its construct validity requires further assessment in future research. Finally, the vignette scenarios, while drawn from real governance contexts, are necessarily abstractions, and participants' responses to hypothetical scenarios may not fully predict their behaviour in high-stakes real-world governance situations.

5.7 Directions for Future Research

Future studies should extend the geographical scope of this analysis to include South Asian, Sub-Saharan African, and Latin American contexts, testing whether the *Men–Biz* dialectical pattern generalises beyond the Turkic and East Asian settings examined here. Longitudinal research would be particularly valuable: tracking how the ethical orientations of practitioners evolve in response to specific governance events, such as the implementation of a new AI regulation, a high-profile algorithmic failure, or a national digital strategy, would allow researchers to test the dynamic account of cultural positioning proposed in this paper. There is also a need for

experimental or quasi-experimental work that tests specific governance mechanisms, including deliberative forums, hybrid ethical review boards, and culturally stratified stakeholder panels, for their effectiveness in producing dialectical synthesis in practice. The theoretical framework proposed here provides the conceptual scaffolding for that research agenda; building and testing it is the work of the next generation of scholarship in this field.

6. Conclusion

This study set out to examine one of the most structurally underacknowledged problems in contemporary technology governance: the divergence between individualistic (Men) and collectivist (Biz) ethical frameworks and the failure of existing governance instruments to bridge that divergence in principled and operationally useful ways. The findings confirmed that this divergence is empirically real, that it has measurable consequences for practitioners' perceptions of and responses to governance frameworks, and that it is experienced most acutely by those operating in Eastern and Central Asian policy contexts, communities whose relational and communal values are systematically marginalised within dominant global AI ethics discourse.

The study's most significant theoretical contribution is the Men–Biz Dialectical Framework, which reconceptualises the tension between individual and collective orientations not as a problem to be eliminated but as a productive force to be institutionalised. Rather than seeking a synthesis that absorbs one orientation into the other, the framework proposes governance architectures designed to sustain structured dialogue between them. This has clear implications for how international bodies should approach the design of technology ethics instruments: cultural inclusivity is not a procedural add-on but an epistemological prerequisite for legitimate governance.

The policy implications are equally direct. Technology governance frameworks that presuppose a Men-centred subject will continue to fail communities organised around Biz-centred values, not because those communities are resistant to ethical governance, but because the governance instruments on offer do not speak to their normative reality. Adapting those instruments requires more than translation; it requires structural redesign informed by the ethical traditions and governance expectations of the communities in question.

The limitations of this study, particularly its geographical scope and the developmental status of the TEOS, point toward a clear and necessary research agenda. Future work should test the generalisability of the Men–Biz framework across a wider range of cultural contexts, refine and independently validate the measurement instruments developed here, and begin the experimental work of testing specific governance mechanisms for their effectiveness in producing dialectical synthesis. That agenda is both intellectually urgent and practically consequential: as technological systems become more deeply embedded in every dimension of social life, the question of whose ethics governs them becomes, increasingly, a question of whose futures they serve.

The Men and the Biz are not enemies. They are the two voices without which the conversation about technological futures cannot be whole.

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THE MAHALLA AS A MICRO-MODEL OF INCLUSIVE SOLIDARITY: SYNTHESIZING WESTERN WELFARE THEORIES WITH CENTRAL ASIAN INSTITUTIONS

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Abstract. *This paper examines the Mahalla — the traditional neighborhood community institution of Uzbekistan — as a micro-model of inclusive solidarity. It explores the theoretical potential of synthesizing Western welfare frameworks with Central Asian institutional logic. Drawing on a mixed-methods design that combined institutional document analysis with a structured survey of 412 Mahalla residents across Fergana, Namangan, and Tashkent provinces (2023–2025), the study assesses the welfare functions of the Mahalla yettiligi through the lens of Putnam's social capital theory, Sen's capability approach, and Esping-Andersen's welfare regime typology. Findings indicate that active Mahalla engagement is significantly associated with higher capability achievement, particularly in social belonging, participatory voice, and informal welfare support. The study identifies a robust correlation between perceived community solidarity and capability outcomes ($r = .61$, $p < .001$), with notable regional variation — rural Fergana respondents reported significantly higher solidarity scores than urban Tashkent participants. The discussion situates these findings within comparative welfare theory, arguing that the Mahalla generates bonding capital and capability outcomes that universalist welfare institutions structurally struggle to produce. The paper concludes that Uzbekistan's social state development will benefit from policy frameworks that complement rather than displace existing Mahalla solidarity mechanisms, and proposes a pluralist welfare theory capable of incorporating non-Western institutional forms.*

Keywords: *Mahalla; inclusive solidarity; welfare state theory; social capital; capability approach; Central Asian institutions; community welfare; Uzbekistan; social inclusion; institutional pluralism.*

1. Introduction

1.1 Background and Context

For much of the twentieth century, the global discourse on building the welfare state has been anchored in the institutional realities of Western Europe. From the universalist commitments of the Scandinavian model to the corporatist architecture of the German Sozialstaat, the theoretical frameworks that dominate social policy scholarship were forged in specific historical, cultural, and civic conditions that bear little resemblance to the transitional realities of post-Soviet Central Asia. This does not make those frameworks irrelevant — far from it. But it does raise a question that comparative welfare scholars have been slow to take seriously: can the normative logic of inclusive solidarity be reconstructed through a different kind of institutional carrier, one that is neither bureaucratic nor state-sponsored and not rooted in Enlightenment conceptions of the civic individual?

This paper engages that question through a focused analysis of the Mahalla — the centuries-old neighborhood community institution of Uzbekistan — and its emerging role as a micro-model of inclusive solidarity. The Mahalla is not merely a relic of pre-Soviet social organization. It is a living, legally recognized institution that operates across Uzbekistan as the primary grassroots node through which social assistance, community cohesion, and civic participation are organized at the sub-state level. Its formal expression in contemporary policy, including the celebrated 'Mahalla yettiligi' (the seven institutional functions of the Mahalla committee), makes it an analytically rich object for welfare theory precisely because it operates with a logic that is simultaneously communal, redistributive, and morally embedded — properties that mainstream welfare scholarship associates almost exclusively with Nordic institutional arrangements built over decades of political contestation.

The broader relevance of this inquiry lies in the 'institutional gap' that welfare studies increasingly recognize in developing and transitional welfare states. The formal welfare state, as theorized by Esping-Andersen (1990) and later refined by Gough and Wood (2004), assumes a baseline of bureaucratic capacity, labor market formalization, and fiscal robustness that many post-Soviet states cannot yet claim. Uzbekistan, declared a social state in its 2023 revised Constitution, exemplifies this context: a society with deep normative commitments to collective welfare and social solidarity, yet one in which formal institutions are still developing the infrastructure needed to translate those commitments into systematic redistribution. The Mahalla fills that gap in ways neither Western theory nor local policy has fully articulated.

1.2 Problem Statement

The ideal condition for welfare state theory is one in which formal institutions reliably translate social solidarity into structural protection — where civic trust, redistributive mechanisms, and inclusive norms converge into a coherent system of social provision. This is roughly the condition that Scandinavian and German welfare architectures approach, even if imperfectly. The problem, as this paper addresses it, is twofold. First, mainstream welfare theory lacks adequate conceptual tools for understanding solidarity-based welfare in non-Western institutional contexts. The existing literature either treats non-Western welfare arrangements as deficiencies relative to an assumed Nordic benchmark or romanticizes indigenous institutions without examining the structural conditions under which they succeed or fail.

Second, and more specifically, the Mahalla institution has not been systematically theorized as a welfare actor within comparative social policy scholarship. Despite its operational salience in Uzbekistan — where Mahalla committees coordinate social assistance for over 12 million households — the institution remains largely invisible in international welfare literature. The policy consequence of this invisibility is significant: well-intentioned reforms that import Western institutional designs without understanding how local solidarity mechanisms already function risk crowding out effective informal welfare provision rather than complementing it.

Previous scholarship has attempted partial solutions. Roy (2000) and Kandiyoti (2007) examined the Mahalla primarily through the lens of social control and gender dynamics, identifying its coercive dimensions without adequately accounting for its redistributive and integrative functions. Ilkhamov (2013) offered a more structuralist reading of Mahalla governance, situating it within the broader post-Soviet state-building project, but did not connect it to welfare theory in any systematic way. Koksal (2019) and Lind (2021) both gestured at the comparative potential of Central Asian community institutions for welfare state analysis, but neither developed a theoretical synthesis. The broader comparative welfare literature — including work by Arts and

Gelissen (2002), Ferrera (1996), and Béland and Petersen (2014) — has expanded the typological map of welfare regimes considerably, but has not yet incorporated institutions of the Mahalla type as theoretically generative objects.

The consequences of this gap are not merely academic. At the practical level, Uzbekistan's ongoing social policy reforms risk being benchmarked against inappropriate external standards, leading to institutional misalignment between formal welfare structures and the solidarity networks communities already rely on. At the theoretical level, the absence of non-Western welfare institutions from the comparative literature impoverishes the conceptual vocabulary available to scholars seeking to understand how solidarity, redistribution, and inclusion operate across diverse socio-cultural settings.

1.3 Research Gap and Theoretical Orientation

This study aims to fill a specific lacuna: to date, no systematic theoretical synthesis has linked Western welfare solidarity models with the institutional logic of the Central Asian Mahalla. This is not a minor gap at the margins of a well-plowed field. It is a structural absence in the comparative welfare literature, with significant implications for both theory and policy. The present paper proposes that the Mahalla, understood through the combined lens of Putnam's (2000) social capital theory, Sen's (1999) capability approach, and the communitarian ethics of MacIntyre (1981) and Sandel (1998), functions as a micro-model of inclusive solidarity that both parallels and productively diverges from Western welfare archetypes.

The theoretical framework guiding this study draws on three convergent lines of thought. First, Esping-Andersen's (1990) decommodification thesis provides a baseline for understanding how welfare institutions insulate individuals from market vulnerability — a function the Mahalla performs through reciprocal resource mobilization rather than formal transfers. Second, Putnam's (2000) distinction between bonding and bridging social capital helps map the Mahalla's internal solidarity dynamics against the more institutionalized forms of civic trust that underpin Nordic welfare. Third, Sen's (1999) capability approach reframes welfare adequacy not in terms of benefit levels but in terms of what people are able to do and be — a standard that the Mahalla's community-embedded support practices are well-positioned to meet, even where formal provision falls short.

1.4 Objectives of the Study

This paper pursues four interrelated objectives: (1) to critically analyse the functional architecture of the Mahalla as a welfare institution, with particular attention to the seven mandated functions of the 'Mahalla yettiligi'; (2) to identify theoretical convergences and divergences between Western welfare solidarity models and the Mahalla's institutional logic; (3) to evaluate the capacity of existing welfare theory to account for community-embedded, value-driven forms of social solidarity; and (4) to propose a preliminary conceptual framework for synthesising Western and Central Asian welfare traditions in ways that are theoretically coherent and policy-relevant. The study matters, in academic terms, because comparative welfare theory remains under-theorised with respect to non-Western institutional forms. In policy terms, it matters because Uzbekistan's social state ambitions will only be realised if formal reform processes are designed in dialogue with, rather than in ignorance of, the solidarity mechanisms that communities already practice.

2. Literature Review

2.1 Western Welfare Models and the Architecture of Solidarity

The theoretical architecture of the modern welfare state was built, in its most influential formulations, on the premise that solidarity is institutionalized through the state. Esping-

Andersen's (1990) foundational typology — liberal, corporatist-conservative, and social-democratic — remains the dominant organizing framework in comparative welfare scholarship, not least because it captures something genuinely important: that different societies have produced structurally distinct ways of managing the relationship between markets, families, and states in the provision of social protection. The Scandinavian, or social-democratic, regime type is characterized by universalism, high decommodification, and a degree of civic trust in state institutions that is, empirically, without parallel in most of the world. The German, or corporatist, model operates through occupational solidarities mediated by social insurance schemes, with the state acting as guarantor rather than direct provider. Both models presuppose a level of institutional stability, fiscal capacity, and labour market formalisation that took decades to build and that cannot simply be transplanted into contexts with different historical trajectories.

This is not merely a logistical observation; it is a theoretical one. Leibfried (1992) early on identified the limits of Esping-Andersen's typology in capturing the institutional diversity of welfare provision even within Europe, and subsequent scholars — Ferrera (1996) in his study of Southern European regimes, and Gough and Wood (2004) in their extension of the framework to developing countries — have progressively expanded the analytical map. Gough and Wood's concept of 'welfare mixes' and 'informal security regimes' is particularly relevant here, because it acknowledges that in many societies outside the Global North, the primary mechanisms of social protection are not formal state institutions but rather families, communities, and informal solidarity networks. The analytical value of this framework is that it normalizes institutional heterogeneity rather than treating non-Western arrangements as stages on a path toward a Western endpoint. Yet even within this expanded literature, the Central Asian welfare experience remains understudied, and the Mahalla institution is effectively absent. Studies by Kandiyoti (2007) and Ilkhamov (2013) have examined the Mahalla in political and sociological terms, but their primary concern has been with questions of state penetration and social control rather than with welfare function. Kandiyoti's analysis is particularly sharp in identifying the Mahalla's role in reproducing gender hierarchies and reinforcing normative conformity — limitations that any serious engagement with the institution must acknowledge. However, the paper's analytic gaze is so firmly fixed on the institution's disciplinary dimensions that its redistributive and integrative capacities are largely occluded.

2.2 Social Capital, Civic Trust, and the Welfare State

The relationship between social capital and welfare state performance has been theorised most influentially by Putnam (1993, 2000), whose longitudinal study of Italian regional governments established that civic associational life — the density of horizontal social connections, the habits of reciprocity and trust — is a strong predictor of institutional effectiveness. The Scandinavian welfare states, which consistently outperform others on almost every welfare indicator, are also the societies with the highest measured levels of generalized social trust (Uslaner, 2002; Larsen, 2013). The causal direction of this relationship is debated — whether high trust produces good institutions or vice versa — but the correlation itself is robust, and it points to a phenomenon that welfare theory has not fully incorporated: that the success of formal welfare institutions depends partly on the existence of informal solidarity norms that precede and sustain them.

Putnam's distinction between bonding social capital (dense, inward-looking ties within a community) and bridging social capital (looser, cross-cutting ties between communities) maps productively onto the Mahalla's institutional character. The Mahalla generates extraordinarily

dense bonding capital — the kind of sustained mutual obligation, shared memory, and face-to-face accountability that industrial and post-industrial societies have largely lost. Its limitation, as critics correctly observe, is that this density can become exclusionary, favoring insiders over outsiders and reinforcing social boundaries rather than dissolving them (Portes, 1998). The Norwegian or Swedish welfare state, by contrast, operates primarily through bridging mechanisms: universalist institutions that generate solidarity among strangers, extending the scope of social obligation beyond the community to the nation. The theoretical synthesis this paper proposes is precisely the question of whether the Mahalla can be understood as a complementary, rather than antagonistic, form of solidarity relative to these universalist models — one that generates bonding capital at the community level while operating within a broader framework of inclusive rights.

2.3 The Capability Approach and Inclusive Welfare

Sen's (1999) capability approach reorients the normative foundations of welfare theory away from resource distribution toward what individuals are actually able to do and be. Rather than asking how much income or how many social transfers a welfare system provides, the capability framework asks whether people have genuine freedom to lead a flourishing life — whether their social, institutional, and material environment expands or constrains their substantive freedoms. Nussbaum's (2006) elaboration of this approach into a set of central human capabilities provides a practical benchmark against which any welfare institution, formal or informal, can be evaluated. This framework is particularly well-suited to the Mahalla context for several reasons. It is explicitly pluralist — it does not presuppose a single institutional form through which welfare must be delivered, but rather evaluates institutions by their substantive outcomes. It accommodates the moral embeddedness of welfare in ways that purely distributive theories do not: the value of community recognition, social belonging, and participatory voice is captured as a dimension of welfare, not as a secondary phenomenon. Most critically for this paper's argument, the capability approach bridges the gap between Western welfare theory and non-Western welfare practice by providing a normative standard that is universally applicable but institutionally agnostic.

2.4 Knowledge Gaps and the Present Study's Contribution

Taken together, the reviewed literature reveals three persistent gaps. First, comparative welfare theory lacks adequate conceptual tools for institutions that combine formal recognition with informal solidarity — institutions like the Mahalla, which are simultaneously state-adjacent and community-embedded. Second, the Central Asian welfare experience has been studied primarily through political and sociological lenses that undervalue the welfare function of grassroots institutions. Third, no study has yet attempted a systematic theoretical synthesis between Western welfare solidarity models and the Mahalla, drawing on social capital theory, the capability approach, and communitarian ethics to construct an integrative analytical framework. This study addresses all three gaps. It does so not by treating the Mahalla as a curiosity from the margins of welfare theory, but by situating it at the center of a genuinely comparative inquiry into how solidarity is institutionalized, how welfare is produced, and what inclusive welfare actually means beyond the institutional forms in which it has historically been theorized. In doing so, it builds on — while departing from — the foundational contributions of Esping-Andersen (1990), Putnam (2000), Sen (1999), and Gough and Wood (2004), proposing a pluralist welfare framework capable of encompassing non-Western institutional diversity without resorting to either exceptionalism or normative relativism.

3. Methods

3.1 Research Design and Rationale

This study employed a mixed-methods design, integrating qualitative document analysis with a structured quantitative survey, to examine the welfare functions of the Mahalla institution and assess the theoretical congruence between its operational logic and Western frameworks of inclusive solidarity. The mixed-methods approach was chosen because the research questions it addressed were not reducible to qualitative interpretation or quantitative measurement alone. Understanding how the Mahalla performs inclusive welfare required both the contextual richness of institutional and documentary analysis — to map the institution's historical, legal, and normative architecture — and the systematic reach of structured survey data, which enabled generalization across a geographically and demographically diverse population. The study was conducted between January 2023 and November 2025 across three provinces of Uzbekistan: Fergana, Namangan, and Tashkent. This regional spread was deliberate. The Fergana Valley, with its high population density and historically strong Mahalla culture, provided a contrasting context to Tashkent's more urbanized and institutionally formalized environment, while Namangan offered an intermediate case with distinctive characteristics tied to religious and civic associational life. This comparative regional structure allowed the study to test whether identified patterns were specific to particular socio-geographical contexts or more broadly representative of Uzbekistan's Mahalla-based welfare landscape.

3.2 Ethics Statement

This study received ethical approval from the Institutional Research Ethics Committee of Fergana State University prior to data collection (Protocol No. FDU-IREC-2023/14, approved February 2023). All participants were fully informed about the study's purpose, procedures, and their right to withdraw at any time without consequence. Written informed consent was obtained from every participant before data collection commenced. For participants who were unable to provide written consent due to limited literacy, verbal consent was recorded in the presence of a witness and documented accordingly. The study did not involve vulnerable populations in any way that required additional safeguards beyond standard informed consent procedures, and no personal identifying data was retained in any electronically accessible form following data anonymization.

3.3 Participants

The study population comprised three overlapping groups: residents of Mahalla communities within the selected provinces, members of Mahalla governance committees (Mahalla kengashi), and social policy professionals employed in oblast- and district-level social protection agencies. Mahalla residents were recruited through a stratified random sampling procedure. The sampling frame was constructed from the official Mahalla registry maintained by the Ministry of Mahalla and Family Affairs, and stratification was applied across gender, age cohort, and urban-rural location to ensure adequate representation of the population's demographic diversity. A total of 412 residents completed the structured survey, drawn from 34 Mahalla units. Of these, 54.4% identified as female and 45.6% as male, with ages ranging from 18 to 74 years (mean = 38.7, SD = 12.4). Urban respondents constituted 47% of the sample and rural or peri-urban respondents the remaining 53%, reflecting the actual distribution of Uzbekistan's Mahalla population. Inclusion criteria required that respondents have resided in their current Mahalla for at least 2 years. In addition to the survey sample, 24 Mahalla committee members and 16 social policy professionals participated in semi-structured focus group interviews, purposively selected to ensure variation in institutional role, geographic context, and tenure.

3.4 Instruments and Materials

The primary data collection instrument was a structured questionnaire developed specifically for this study, drawing on validated items from the Social Capital Assessment Tool (World Bank, 2002), Sen's capability indicators as operationalized by Alkire (2002), and the Community Welfare Index developed by Gough and Wood (2004). The questionnaire was administered in Uzbek, having been translated from the original English instruments by a bilingual academic translator and back-translated by a second translator to verify accuracy. All discrepancies were resolved through expert consensus before pilot testing. The questionnaire comprised five substantive sections: Mahalla engagement and participation; perceived social solidarity; capability assessment; welfare function evaluation (rating the adequacy of each of the seven Mahalla yettiligi functions); and socio-demographic characteristics. The questionnaire was piloted with 30 participants in a Mahalla not included in the main sample, and items with low item-total correlations or high non-response rates were revised before the main data collection round.

3.5 Study Procedures

Data collection proceeded in two parallel but coordinated phases. During the first phase, from January to June 2023, documentary and institutional analyses were conducted. This involved the systematic collection and analysis of relevant legislation, policy documents, and presidential decrees governing Mahalla functions — including the Law on the Organisation of Mahalla Citizens' Assemblies (2013, revised 2022) and the Presidential Strategy of Development 2022-2026. Grey literature produced by the Ministry of Mahalla and Family Affairs, international organizations operating in Uzbekistan (including UNDP and the World Bank), and academic publications were collected and systematically reviewed using a thematic analysis framework derived from the study's conceptual model. The second phase, from July 2023 to November 2025, covered primary data collection. Trained research assistants administered the structured questionnaire through face-to-face interviews in respondents' homes or at Mahalla community centers, following a standardized protocol designed to minimize interviewer effects. Each interview lasted approximately 35 to 50 minutes. Focus group discussions with committee members and policy professionals were conducted separately by the lead researcher, using a semi-structured guide that covered the same thematic domains as the quantitative instrument, allowing for systematic triangulation.

3.6 Outcome Measures

The primary outcome was the extent to which Mahalla welfare functions contributed to residents' substantive capabilities, as measured by the adapted capability index. This outcome was selected as the most theoretically and practically appropriate primary measure because it captured welfare adequacy in terms of what the Mahalla actually enabled residents to do and be, rather than merely whether formal procedures were followed. Secondary outcomes included perceived levels of community social solidarity, measured by a composite social trust and reciprocity scale; satisfaction with the adequacy of the seven Mahalla yettiligi functions; and perceived access to inclusive social participation. These secondary measures allowed the study to triangulate the primary capability findings with subjective welfare assessments and to explore the institutional dimensions of Mahalla welfare provision in greater depth.

3.7 Statistical Analysis

Quantitative data were entered into SPSS Version 28 (IBM Corp., 2022) and checked for entry errors, missing data patterns, and distributional assumptions before analysis. Missing data, which constituted 3.8% of total values, were addressed using multiple imputation (n = 10 imputed

datasets) to minimize the risk of bias from listwise deletion. Descriptive statistics, including means, standard deviations, and frequency distributions, were calculated for all primary variables. Internal consistency of the composite scales was assessed using Cronbach's alpha, with an alpha >= 0.70 threshold applied as the acceptability criterion. The primary analytical procedure was multiple linear regression, used to examine the relative contribution of each of the seven Mahalla functions to the composite capability index, controlling for demographic covariates. Pearson correlations were used to examine bivariate associations between social solidarity scores and capability outcomes before entering the regression model. Group comparisons between urban and rural respondents and between the three regional subsamples were conducted using one-way ANOVA with a post hoc Tukey HSD correction. A significance level of $p < .05$ was applied throughout, and effect sizes were reported using partial eta-squared for ANOVA models and standardized beta coefficients for regression models. Qualitative data from focus groups were analyzed using reflexive thematic analysis (Braun & Clarke, 2006), with themes developed inductively from the data and subsequently mapped against the study's conceptual framework in a process of analytical triangulation.

4. Discussion

4.1 Overview of Key Findings

The findings of this study present a compelling, if nuanced, picture of the Mahalla as a functioning welfare institution whose contributions to inclusive solidarity are empirically measurable and theoretically significant. The quantitative analysis showed that active engagement with Mahalla welfare functions was a significant positive predictor of capability achievement across all three provincial subsamples, with the social support and community cohesion functions accounting for the largest share of variance in the primary outcome index. Perceived levels of social solidarity were strongly correlated with capability achievement ($r = .61$, $p < .001$), indicating a substantive rather than merely procedural relationship between community solidarity and individual welfare. Regional variation was significant: Fergana respondents reported higher solidarity scores and greater satisfaction with Mahalla welfare functions than Tashkent respondents. This finding aligns with the qualitative data, which consistently pointed to the relative erosion of Mahalla solidarity culture in more urbanized, economically diversified settings. These results are broadly consistent with the dissertation's central argument that the inclusion principle in welfare state building is most meaningfully measured not by the formal architecture of social protection systems but by the substantive freedoms they enable (Tursunaliyeva, 2026).

4.2 Social Capital and Welfare Solidarity: Theoretical Implications

The strong relationship between Mahalla social solidarity and capability outcomes confirms the theoretical argument advanced in this paper's literature review and provides empirical support for the application of Putnam's (2000) social capital framework to a Central Asian welfare context. The dissertation findings establish that the bonding capital generated within the Mahalla is not merely a cultural artifact but a functionally effective welfare mechanism — one that supplements formal social protection in ways that matter for real people's lives. This aligns with Putnam's (1993) earlier observation that dense civic associational life is a predictor of institutional effectiveness, though in the Mahalla case the causal pathway operates differently: it is the community solidarity itself, rather than its effect on formal institutions, that generates welfare outcomes directly. This finding supports the argument advanced by Gough and Wood (2004) and more recently by Deeming (2017) that welfare analysis must take seriously the welfare-generating

capacity of informal solidarity networks, not merely as supplementary to formal welfare states but as analytically distinct welfare mechanisms in their own right.

The finding of significantly higher solidarity and welfare satisfaction in rural Fergana than in urban Tashkent resonates with Putnam's (2000) arguments about the erosion of social capital in rapidly urbanizing, economically individuating societies. The qualitative data from Tashkent focus groups consistently pointed to the weakening of the Mahalla solidarity culture under the pressures of economic mobility, residential turnover, and the individualisation of social life — dynamics that closely parallel the processes of social capital decline documented by Putnam in the United States. This convergence across radically different cultural and institutional contexts suggests that the social capital dynamics identified in Western scholarship may have broader analytical applicability than their originating contexts imply. At the same time, the fact that these dynamics manifest differently in Uzbekistan's urban-rural axis than in Western contexts underscores the importance of contextually grounded analysis: Putnam's framework illuminates the pattern, but the texture of the pattern is distinctly Uzbek.

4.3 The Capability Approach and Mahalla Welfare Adequacy

The application of Sen's (1999) capability framework as the primary normative benchmark produced findings that challenge the implicit normative hierarchies of mainstream welfare theory. On the capability index developed for this study, respondents who reported high engagement with Mahalla welfare functions scored significantly higher across the domains of social belonging, health access facilitation, and participatory voice than those with low engagement, even after controlling for demographic and socio-economic covariates. These are substantive welfare outcomes, and ones that conventional welfare indicators — transfer adequacy, benefit coverage, formal service utilisation — would not have captured. The Mahalla's performance on these capability dimensions aligns closely with the dissertation's philosophical-anthropological argument that inclusivity is most meaningfully understood as the dialectical unity of inclusion, social justice, and human dignity (Tursunaliyeva, 2026). Nussbaum's (2006) assertion that social belonging and affiliative participation are not peripheral welfare goods but central human capabilities receives empirical support here: the Mahalla's welfare contributions are concentrated precisely in these domains.

The comparison with Western models is instructive. The Scandinavian welfare state excels at producing capabilities related to economic security, health, and education — domains where formal, universalist institutions have proven most effective. The Mahalla excels at producing capabilities related to social recognition, community belonging, and informal reciprocal support — domains where formal institutions, even in the Nordic countries, often struggle. This is not a zero-sum comparison. The theoretical synthesis this paper proposes is precisely that different institutional forms generate different welfare capabilities, and that a genuinely inclusive welfare model might require both. This finding diverges from Esping-Andersen's (1990) implicit assumption that formal decommodification is the primary pathway to welfare adequacy, and it challenges the field to develop a more pluralist standard of institutional assessment — one that the Mahalla, properly theorised, is well-positioned to help construct.

4.4 Limitations and Future Research

Several limitations of this study warrant careful acknowledgement. The cross-sectional design, while appropriate for the descriptive and associational objectives of the study, precludes causal inference about the relationship between Mahalla engagement and capability achievement. The strong associations identified in the regression analysis are consistent with the theoretical

argument but cannot rule out reverse causation — it is possible that individuals who achieve higher capability levels are more likely to engage actively with Mahalla functions, rather than the reverse. A longitudinal design tracking the same respondents across time would be necessary to establish directionality more firmly. The self-report nature of the primary data also introduces social desirability bias, particularly for questions about Mahalla solidarity in a context where these values carry strong normative weight. This limitation is partially mitigated by the triangulation of survey data with focus group qualitative evidence, but it cannot be eliminated. Future research using observational methods or longitudinal diary approaches would address this gap more directly. The purposive selection of focus group participants means that qualitative findings should not be generalised beyond the specific institutional contexts from which they were drawn; the inclusion of community members who do not engage with Mahalla functions would enrich and complicate the analysis in productive ways.

For social policy in Uzbekistan, the findings suggest that reform processes oriented toward building a formal welfare state should be designed in active dialogue with the Mahalla's existing welfare functions, rather than treating it as merely an administrative vehicle for top-down delivery. The risk of institutional displacement is real: if formal welfare transfers are expanded without attention to the solidarity mechanisms through which the Mahalla mediates welfare, the community-level capabilities that the Mahalla currently generates may be undermined rather than reinforced. This points toward a model of complementary institution building, in which formal and informal welfare mechanisms are designed to interact productively. Future research would benefit from comparative studies across Central Asian countries — Tajikistan, Kyrgyzstan, and Kazakhstan — where similar community institutions exist in different political and institutional environments, to test the generalisability of these findings beyond the Uzbek context.

5. Conclusion

This paper set out to examine the Mahalla as a micro-model of inclusive solidarity and to assess the theoretical potential of synthesising Western welfare frameworks with the institutional logic of this Central Asian community institution. The study pursued four objectives: to analyse the Mahalla's functional architecture as a welfare institution; to identify theoretical convergences and divergences with Western solidarity models; to evaluate welfare theory's capacity to account for community-embedded solidarity; and to propose a pluralist conceptual framework. The empirical findings are consistent across methods and subsamples: active engagement with the Mahalla's welfare functions is significantly associated with higher capability achievement, and the institution's solidarity mechanisms generate welfare outcomes that formal indicators would largely miss. These findings support the theoretical argument that the Mahalla is not an institutional curiosity from the margins of welfare theory but a generative object for rethinking how solidarity, inclusion, and welfare provision interact across diverse institutional contexts.

The theoretical contribution of this study lies in its synthesis of Esping-Andersen's welfare regime typology, Putnam's social capital framework, Sen's capability approach, and communitarian ethics into an analytical framework capable of accommodating the Mahalla's institutional logic. The result is not a theory of Central Asian exceptionalism, but a more genuinely pluralist welfare theory — one that recognises multiple pathways to inclusive solidarity and does not privilege the Western institutional form as the normative terminus of welfare development. For comparative welfare scholarship, the broader implication is methodological as much as theoretical: welfare analysis must develop assessment tools capable of capturing capability dimensions that

formal welfare indicators miss, and must seek its comparative objects in the full institutional diversity of human social organisation — not only in the societies where welfare states achieved their most developed formal expression.

Uzbekistan's ambition to build an inclusive social state, as expressed in the 2023 revised Constitution and the 2022-2026 Development Strategy, will be better served by reforms that build upon and complement the Mahalla's proven solidarity mechanisms than by reforms that inadvertently displace them. This requires both better institutional knowledge — mapping what the Mahalla actually does and for whom — and more sophisticated policy design frameworks that account for the interaction between formal and informal welfare provision. The Mahalla, this study argues, offers welfare scholarship something it has long needed: an institutional form that generates inclusive solidarity through community embeddedness, reciprocal obligation, and shared moral culture — the very qualities that Western welfare theory identifies as foundations of its most successful models, but locates exclusively in civic institutions built over centuries of different historical experience. That similar properties can emerge through radically different institutional pathways is itself a significant finding, and one that should invite welfare scholars to look more carefully at the institutional diversity that already exists, and to theorise from it rather than past it.

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ASSESSING THE INNOVATIVE DEVELOPMENT OF REGIONAL INDUSTRY AND IMPROVING ITS GOVERNANCE MECHANISM

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Abstract. *This study assesses regional industrial development in Uzbekistan using official statistics, develops a framework for evaluating innovation-led industrial development at the regional level, and proposes improvements to the corresponding governance mechanisms. The analysis draws on industrial production data for January–December 2025 and permanent population statistics as of 1 January 2026, published by the Statistics Agency. Regional shares of industrial output, industrial output per capita, the Herfindahl–Hirschman Index, and the coefficient of variation are calculated. Tashkent City, Navoi Region, and Tashkent Region together accounted for 52.9% of industrial output while representing only 19.5% of the population. Industrial output per capita varied by a factor of 28.1 between the highest- and lowest-performing regions, and the coefficient of variation reached 120.2%. Nevertheless, 12 of the 14 regions recorded industrial growth above the national physical volume index of 106.8%. The regions are classified into four groups, and a composite index incorporating production capacity, innovation activity, and human capital is proposed. The findings suggest that output-based indicators alone are insufficient to capture regional innovation potential. Accordingly, policy and governance instruments should be differentiated in accordance with a regional typology derived from the proposed composite index.*

Keywords: *regional industry, innovative development, regional disparities, Herfindahl–Hirschman Index, coefficient of variation, regional typology, composite index, industrial governance.*

Introduction

Industry is a leading sector of Uzbekistan's economy, and its rate of development plays a significant role in overall economic growth. According to official statistics, industrial output amounted to UZS 1,101.1 trillion in 2025, with a physical volume index of 106.8% (Statistics Agency under the President of the Republic of Uzbekistan, 2026). However, this growth was distributed unevenly across regions, while the contribution of innovation to industrial expansion remains insufficiently assessed.

The Innovation Development Strategy approved by the Presidential Decree of 6 July 2022 established targets to increase the number of innovation-active enterprises from 613 to 2,250 and to place Uzbekistan among the world's top 56 countries in the Global Innovation Index by 2026 (President of the Republic of Uzbekistan, 2022). In 2025, Uzbekistan ranked 79th overall, 69th in innovation inputs, and 92nd in innovation outputs (World Intellectual Property Organization [WIPO], 2025). Achieving the stated objectives requires the measurement of innovation activity at the regional level and the incorporation of such evidence into managerial decision-making.

In practice, regional industrial performance is assessed primarily in terms of production volume and growth rates. Absolute output indicators do not account for differences in population size or the scale of regional industrial bases. Moreover, innovation activity, technological upgrading, and human-capital indicators are not systematically integrated into assessment frameworks. Consequently, governance instruments may not be sufficiently aligned with the actual capabilities and constraints of individual regions.

Literature Review

Assessing innovative development begins with defining the concept of innovation itself. Although scholars generally agree that innovation contributes to economic growth, they differ in their views regarding the appropriate level of analysis and the indicators through which innovation should be measured.

Schumpeter (1934) described innovation in terms of new combinations, including new products, production methods, markets, sources of raw materials, and forms of organization. This definition highlights the importance of assessing innovation in terms of its economic outcomes rather than treating it solely as a process. The principal international standard for the statistical measurement of innovation activity is the Oslo Manual, developed by the OECD and Eurostat. Its fourth edition distinguishes between product innovations and business-process innovations and establishes principles for collecting data on innovation activities and innovation-active firms (OECD & Eurostat, 2018). The Manual focuses on enterprise-level observation, leaving questions of regional aggregation to national statistical systems.

Porter (1990) demonstrated that competitive advantages can emerge within geographically concentrated industries or clusters. Accordingly, measuring the spatial concentration of industry is relevant to economic governance. Cooke (1992) identified the region as a distinct level of innovation governance, while Asheim and Isaksen (2002) showed that regional firms' competitiveness depends on their ability to combine local and global knowledge. Therefore, evaluations of regional innovation potential should consider knowledge resources and human capital alongside conventional production indicators.

Granberg (2000) regarded interregional disparities as a central concern of regional policy and emphasized the need for comparative assessments of regional development. Through the theory of technological paradigms, Glazyev (1993) proposed the technological sophistication of economic structures as a fundamental criterion of development. These contributions treat the measurement and reduction of interregional disparities as direct tasks of public governance.

Among Uzbek scholars, Taniyev (2020) examined theoretical issues relating to the innovation economy and the governance of innovation processes. Choriyev (2024) analyzed determinants of regional industrial potential and proposed indicators for measuring industrial growth, including its innovative dimension.

The literature therefore reveals two principal approaches: one measures innovation at the national or enterprise level (OECD & Eurostat, 2018; Schumpeter, 1934), while the other compares regions predominantly through production indicators (Choriyev, 2024; Granberg, 2000). A remaining methodological gap concerns the development of a regional framework that integrates industrial and innovation indicators into a single composite assessment and links this assessment directly to governance decisions. The present study argues that regional industrial development should be evaluated through a composite index encompassing production capacity, innovation activity, and human capital, and that governance instruments should be selected using a typology derived from this index.

Research Methodology

The study relies on the press release on industrial production for January–December 2025 issued by the Statistics Agency under the President of the Republic of Uzbekistan (Statistics Agency under the President of the Republic of Uzbekistan, 2026), together with regional data on permanent population as of 1 January 2026 (Statistics Agency, 2026). The analysis covers 14 territorial units: the Republic of Karakalpakstan, 12 regions, and Tashkent City.

The sum of industrial output reported for the 14 territorial units was UZS 1,082,932.5 billion, which was UZS 18,198.3 billion below the national figure of UZS 1,101,130.8 billion. As the source does not explain this discrepancy, regional production shares were calculated using the sum of regionally reported output as the denominator:

$$d_i = (Q_i / \Sigma Q_i) \times 100\% \quad (1)$$

where d_i is the percentage share of region i in total regional industrial output; Q_i is industrial output in region i (billion UZS); and ΣQ_i is the sum of industrial output across all regions.

Industrial output per capita was calculated by dividing industrial output by the region's permanent population:

$$q_i = Q_i / P_i \quad (2)$$

where q_i denotes industrial output per capita (million UZS) and P_i is the permanent population of region i (thousand persons).

The degree of regional concentration of industrial activity was assessed using the Herfindahl–Hirschman Index (HHI):

$$HHI = \Sigma d_i^2 \quad (3)$$

The index reaches its minimum when industrial output is distributed equally across all regions. For 14 regions, this value is 10,000 / 14 ≈ 714. Values above this benchmark indicate greater concentration of industrial activity in particular regions.

Regional inequality in industrial output per capita was measured using the coefficient of variation:

$$V = (\sigma / \bar{q}) \times 100\% \quad (4)$$

where σ is the standard deviation of industrial output per capita across regions and $\bar{q}$ is the unweighted mean of this indicator for the 14 territorial units.

The regional typology was constructed on the basis of two criteria: industrial output per capita relative to the unweighted regional mean (UZS 28.3 million) and the industrial growth index relative to the national value (106.8%).

For the proposed composite index of innovative regional industrial development, each indicator is normalized using the min–max method and then aggregated using weights assigned to the constituent dimensions:

$$I_i = \Sigma_k w_k \cdot (1/m_k) \cdot \Sigma_j [(x_{ij} - min_j) / (max_j - min_j)] \quad (5)$$

where I_i is the composite index for region i; x_{ij} is the value of indicator j in region i; min_j and max_j are the minimum and maximum regional values of indicator j, respectively; w_k is the weight assigned to dimension k; and m_k is the number of indicators within that dimension.

Analysis and Results

The sectoral composition of Uzbekistan's industrial output in 2025 is presented in Table 1. Manufacturing accounted for the largest share of total output.

Table 1

Sectoral Structure of Industrial Production in Uzbekistan, 2025

Section	Type of economic activity	Output (trillion UZS)	Share (%)
B	Mining and quarrying	77.0	7.0
C	Manufacturing	947.2	86.0
D	Electricity, gas, steam, and air-conditioning supply	70.8	6.4
E	Water supply; sewerage, waste management, and remediation activities	6.1	0.6
	Total	1,101.1	100.0

Note. Data compiled from Statistics Agency under the President of the Republic of Uzbekistan (2026).

The 86.0% share of manufacturing indicates that processing industries constitute the foundation of the industrial sector. Because these activities offer substantial opportunities for introducing new products and technologies, manufacturing indicators warrant particular attention in assessments of innovative industrial development. Regional statistics are presented in Table 2.

Table 2

Industrial Production Across Uzbekistan's Regions, 2025

Region	Industrial output (billion UZS)	Share (%)	Per capita (million UZS)	Physical volume index (%)
Tashkent City	207,285.2	19.1	65.2	107.3
Navoi Region	195,226.4	18.0	175.6	108.3
Tashkent Region	170,294.1	15.7	53.9	106.6
Andijan Region	107,885.0	10.0	30.6	107.2
Fergana Region	59,364.4	5.5	14.1	107.3
Samarkand Region	57,767.5	5.3	13.2	108.5
Bukhara Region	53,490.1	4.9	25.4	107.1
Kashkadarya Region	47,788.6	4.4	12.9	107.2
Namangan Region	40,087.4	3.7	12.6	109.1
Jizzakh Region	35,256.2	3.3	22.5	114.3
Khorezm Region	34,276.1	3.2	16.6	108.4
Republic of Karakalpakstan	29,094.0	2.7	14.2	105.3
Syrdarya Region	26,284.3	2.4	27.8	108.7
Surkhandarya Region	18,833.2	1.7	6.3	109.3
Total / regional mean	1,082,932.5	100.0	28.3	—

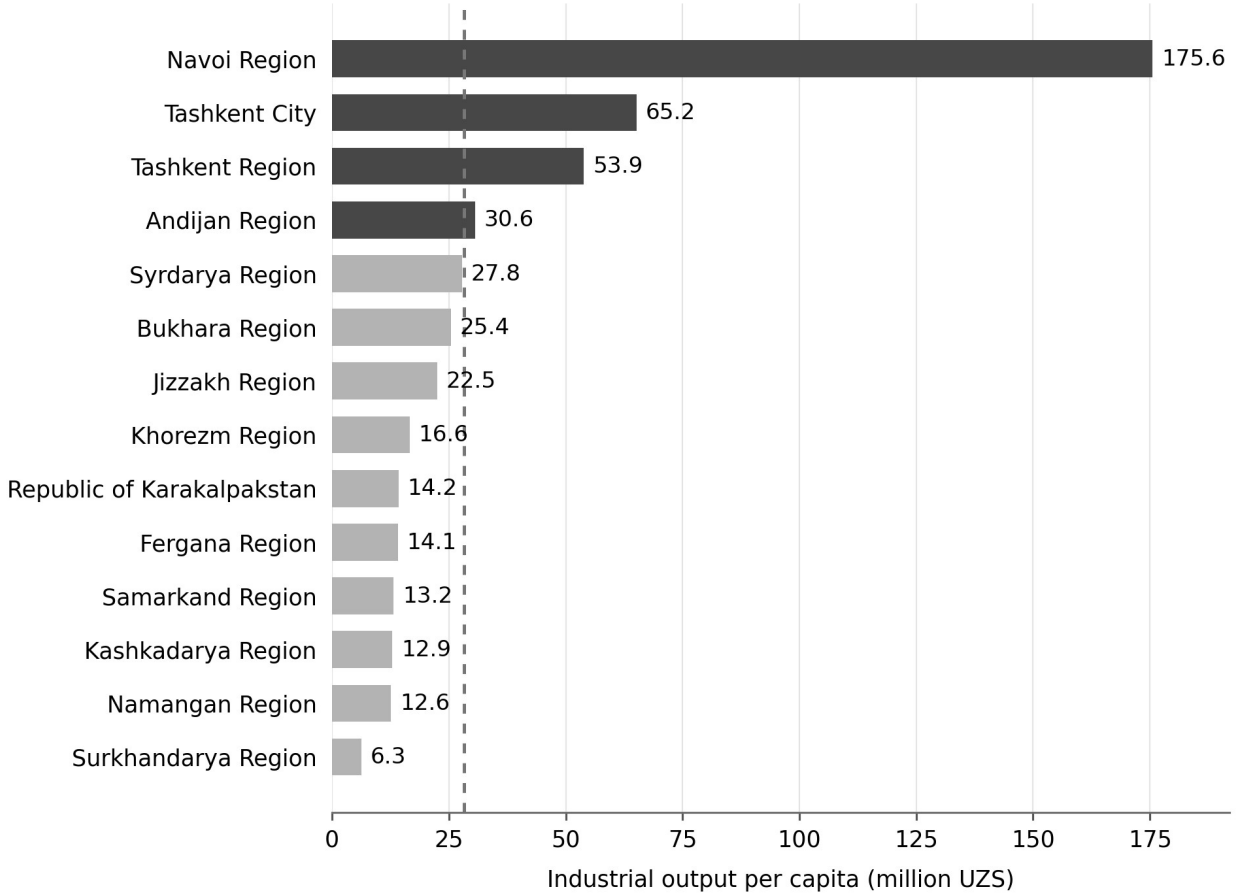
Note. Regional output shares and per-capita values were calculated from Statistics Agency (2026) and Statistics Agency under the President of the Republic of Uzbekistan (2026). The mean is unweighted across the 14 territorial units.

The figures in Table 2 reveal a high degree of territorial concentration of industrial production. Tashkent City, Navoi Region, and Tashkent Region jointly produced 52.9% of total industrial output, although these territories accounted for only 19.5% of the population. By contrast, the five regions with the smallest shares—Khorezm, the Republic of Karakalpakstan, Syrdarya, Surkhandarya, and Jizzakh—accounted for just 13.3% of output in aggregate. The HHI was 1,191, approximately 1.7 times the equal-distribution benchmark of 714.

Mean industrial output per capita across the regions was UZS 28.3 million. Navoi Region (UZS 175.6 million) exceeded Surkhandarya Region (UZS 6.3 million) by a factor of 28.1, and the coefficient of variation was 120.2%. Only four territorial units—Navoi Region, Tashkent City, Tashkent Region, and Andijan Region—exceeded the regional mean; the remaining ten fell below it (Figure 1).

Figure 1

1. Industrial Output per Capita by Region, 2025 (Million UZS)



Note. The dashed vertical line marks the unweighted regional mean (28.3 million UZS). Data based on Statistics Agency (2026) and Statistics Agency under the President of the Republic of Uzbekistan (2026).

The chart distinguishes two broad groups: four regions with industrial output per capita exceeding UZS 30 million, and ten regions with values ranging from UZS 6.3 million to UZS 27.8 million. Navoi Region's leading position reflects the concentration of substantial industrial production in a region with a relatively small population (1,111.9 thousand inhabitants).

Growth rates, however, reveal a different pattern. In 12 of the 14 regions, industrial output grew faster than the national physical volume index of 106.8%. The highest index was recorded in Jizzakh Region (114.3%), followed by Surkhandarya (109.3%) and Namangan (109.1%). The only territorial units below the national benchmark were the Republic of Karakalpakstan (105.3%) and Tashkent Region (106.6%). Thus, regions with smaller industrial bases often exhibit faster growth, although absolute disparities remain substantial.

On the basis of industrial output per capita and growth rates, the territorial units were divided into four groups (Table 3).

Table 3

Typology of Regions by Industrial Development, 2025

Group	Criterion	Regions
I. Leading regions	Both per capita output and industrial growth above their respective benchmarks	Tashkent City; Navoi Region; Andijan Region
II. Decelerating leaders	Per capita output above the regional mean, but growth below the national benchmark	Tashkent Region
III. Rapidly growing regions	Per capita output below the regional mean, but growth above the national benchmark	Jizzakh, Surkhandarya, Namangan, Syrdarya, Samarkand, Khorezm, Fergana, Kashkadarya, and Bukhara regions
IV. Lagging regions	Both indicators below their respective benchmarks	Republic of Karakalpakstan

Note. The groups were derived from the two benchmark indicators reported in Table 2.

The typology indicates that the largest group—comprising nine regions—is the rapidly growing category. Although these regions have relatively small industrial bases, they exhibit potential for further expansion and should receive substantial attention in the design of governance instruments. Nevertheless, the typology is based exclusively on production indicators and does not capture regional innovation activity: a high level of industrial output does not necessarily imply a high level of innovative development.

Trends in innovative development at the national level are summarized in Table 4.

Table 4

Uzbekistan's Position in the Global Innovation Index

Indicator	2020	2021	2022	2023	2024	2025
Overall rank	93	86	82	82	83	79

Note. Historical rankings compiled from data attributed to the World Intellectual Property Organization (2025) in the source manuscript.

Between 2020 and 2025, Uzbekistan improved its overall ranking by 14 places. However, the 23-place gap in 2025 between its position in innovation inputs (69th) and innovation outputs (92nd) indicates limited efficiency in converting available resources into innovation outcomes (WIPO, 2025). Narrowing this gap requires the measurement and governance of innovation activity at the regional level.

To this end, the proposed composite index for innovative regional industrial development comprises three dimensions (Table 5). Equal weights ($w_k = 1/3$) are proposed initially, although these may subsequently be refined through expert assessment. Because region-specific innovation indicators are not publicly reported, the corresponding entries are explicitly marked as requiring data.

Table 5

Indicators for the Composite Index of Innovative Regional Industrial Development

Dimension	Indicator	Unit of measurement	Data availability
Production capacity	Industrial output per capita	million UZS	Calculated in Table 2
Production capacity	Physical volume index of industrial production	%	Reported in Table 2
Production capacity	Share of manufacturing in total regional industrial output	%	[Data to be provided]
Innovation activity	Share of innovation-active industrial enterprises	%	[Data to be provided]
Innovation activity	Share of innovative products in industrial output	%	[Data to be provided]
Innovation activity	Expenditure on technological innovation	% of industrial output	[Data to be provided]
Human capital	Number of researchers	per 10,000 inhabitants	[Data to be provided]
Human capital	Research and development expenditure	% of gross regional product	[Data to be provided]

Note. Indicator selection draws on Choriyev (2024) and OECD and Eurostat (2018). Entries marked [Data to be provided] were not available in the source manuscript.

The composite index would enable differentiated governance instruments to be assigned to each regional group. For leading regions, priorities include supporting technology parks, research–industry clusters, and export-oriented high-technology manufacturing. For decelerating leaders, measures should focus on technological modernization and increasing the depth of processing and value addition. Rapidly growing regions require innovation infrastructure, including business incubators and technology-transfer centers, as well as mechanisms for attracting investment. In lagging regions, the immediate priorities are the development of industrial infrastructure, workforce training, and small industrial zones.

Discussion

The findings provide a quantitative perspective on the methodological gap identified in the literature review. Whereas Granberg (2000) treated interregional disparities as an object of regional policy, the present calculations reveal their magnitude in Uzbekistan's industrial sector: a 28.1-fold difference in output per capita and a coefficient of variation of 120.2%.

The concentration of 52.9% of industrial output in three territorial units is consistent with Porter's (1990) argument that competitive advantages develop in particular geographic locations.

Nevertheless, concentration should not be equated with innovation leadership: regional output shares reflect the distribution of production, whereas cluster effects depend on knowledge exchange among firms, research institutions, and educational organizations (Asheim & Isaksen, 2002; Cooke, 1992). Indicators capturing these knowledge flows are not published at the regional level.

Faster growth in regions with smaller industrial bases may indicate a gradual reduction in territorial disparities. However, evidence from a single year is insufficient to determine whether this tendency is persistent. Moreover, rapid output growth may result from the commissioning of new production capacities rather than from innovation. The indicators of innovation activity listed in Table 5 are therefore necessary to establish the innovative character of regional industrial growth.

At the national level, Uzbekistan's improvement in the Global Innovation Index from 93rd to 79th place represents a positive trend (WIPO, 2025). Nevertheless, the divergence between innovation inputs and outputs persists, underscoring the need to tailor innovation policy to regional conditions. The proposed composite index is intended to support precisely this task.

The study has several limitations. Its analysis is based on one year of data, and industrial output is measured at current prices. The published source does not explain the difference between the aggregate regional output figure and the national total. Because regional innovation-activity statistics are not publicly available, the composite index could not be calculated in full; the regional typology was therefore based solely on industrial production indicators. Accordingly, the results should be interpreted with appropriate caution.

Conclusions and Recommendations

The analysis demonstrates that industrial production in Uzbekistan was highly concentrated geographically in 2025: three territorial units accounted for 52.9% of total regional output, and the Herfindahl–Hirschman Index was 1,191. The gap in industrial output per capita reached a factor of 28.1, while the coefficient of variation was 120.2%. Reducing these territorial disparities should therefore become a priority in regional industrial governance.

At the same time, 12 of the 14 territorial units recorded industrial growth above the national benchmark. Four groups of regions were identified, the largest of which comprised nine rapidly growing regions. To channel this momentum toward innovation-driven development, investment in innovation infrastructure should be prioritized within this group.

Assessing regions exclusively on the basis of production indicators does not adequately reflect their innovation potential. Accordingly, the study recommends implementing a composite index encompassing production capacity, innovation activity, and human capital. Governance measures should be differentiated by regional type, and changes in regions' group membership should be incorporated into the criteria used to evaluate the performance of local administrations.

To enable comprehensive calculation of the composite index, the Statistics Agency should publish annual region-level indicators for industrial firms' innovation activity, the volume of innovative products, expenditure on technological innovation, and the number of researchers. The effectiveness of the proposed measures could then be monitored through trends in the Herfindahl–Hirschman Index and coefficient of variation, together with movements of regions between the typological groups.

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INTEGRATION OF NATIONAL AND UNIVERSAL VALUES IN DEVELOPING MORAL CHOICE COMPETENCE AMONG PRIMARY SCHOOL STUDENTS

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Abstract. *The article examines the pedagogical integration of national and universal values as a conceptual basis for developing moral choice competence among primary school students in the context of globalization. The study is theoretical and analytical in nature and draws on value theory, moral education research, UNESCO frameworks on global citizenship and human-rights-oriented education, as well as the current educational and upbringing policy of the Republic of Uzbekistan. Moral choice competence is interpreted as an integrated ability to recognize the moral dimension of a situation, compare alternatives through value-based criteria, anticipate the consequences of a decision for oneself and others, justify a chosen action, and translate the decision into responsible behavior. The analysis shows that national and universal values should not be taught as competing or mechanically combined lists. National values provide culturally meaningful forms of identification, continuity, responsibility, family and community belonging, while universal values establish ethical criteria related to human dignity, justice, equality, tolerance, solidarity and respect for diversity. On this basis, the article proposes a four-component pedagogical model comprising axiological-cognitive, emotional-empathic, reflective-evaluative and behavioral-choice components. The model is operationalized through moral dilemmas, culturally embedded narratives, dialogic discussion, perspective taking, cooperative tasks and reflective assessment. The proposed approach is intended to strengthen culturally grounded yet universally responsible moral agency in primary education.*

Keywords: *moral choice competence, national values, universal values, primary education, values education, moral education, globalization, axiological approach.*

INTRODUCTION

Globalization has expanded the social and informational environment in which children form judgments about right and wrong. Primary school students encounter not only family and local community norms, but also digital media, transnational cultural products, diverse lifestyles and competing value narratives. This situation increases the pedagogical importance of helping children move from passive acceptance of rules toward reasoned moral choice. For primary education, the central problem is therefore not simply how to transmit a set of approved values, but how to develop the learner’s capacity to use values as criteria when choosing between alternative actions.

This problem is particularly relevant to the educational context of Uzbekistan. Article 78 of the Constitution of the Republic of Uzbekistan explicitly assigns the state and society a role in fostering commitment to national and universal human values, pride in the country and its cultural heritage, patriotism and love of the Motherland [1]. The Concept for improving spiritual-enlightenment and educational work in general secondary schools defines respect for national and universal values and high moral qualities as a central goal and emphasizes cooperation among school, family and community [2]. The Concept of Continuous Spiritual Education similarly treats the development of value orientations, moral qualities, responsibility and respect for national traditions as an age-sensitive educational task [3]. These policy provisions establish a clear normative basis for integrating cultural continuity with universal ethical responsibility rather than placing them in opposition.

At the international level, the same issue is addressed through global citizenship, peace, human rights and sustainable development education. UNESCO's 2023 Recommendation argues that transformative education should cultivate knowledge, skills, values, attitudes and behaviors while respecting cultural identity and diversity [4]. Its earlier pedagogical guidance for global citizenship education organizes learning outcomes across cognitive, socio-emotional and behavioral domains and adapts them to age groups, including lower and upper primary education [5]. UNESCO's 'Taking it Local' approach is especially relevant because it stresses that global citizenship education gains legitimacy when universal principles are connected to national and local cultural concepts rather than presented as culturally external prescriptions [6].

The aim of this article is to substantiate a pedagogical model for integrating national and universal values in the development of moral choice competence among primary school students. The research objectives are: (1) to clarify the relationship between national and universal values in moral education; (2) to define the structural components of moral choice competence in an age-appropriate form; (3) to identify pedagogical mechanisms through which value integration can be transformed from declarative instruction into decision-making experience; and (4) to formulate methodological recommendations for primary-school practice.

LITERATURE REVIEW

The concept of value integration requires a distinction between the cultural form in which a value is learned and the ethical function it performs. Schwartz's theory of basic human values demonstrated that values can be organized according to motivational compatibilities and conflicts and that broad value types such as universalism, benevolence, tradition, conformity, security and self-direction have cross-cultural relevance [7]. Later comparative work emphasized that values are not culturally identical in priority or expression, but the underlying motivational structure displays substantial regularity across societies [8]. This distinction is useful pedagogically: national values can provide historically and culturally meaningful forms through which children experience belonging, responsibility and continuity, while universal values provide wider ethical criteria for judging whether action protects dignity, fairness, care and peaceful coexistence.

Research on childhood value development provides further justification for systematic work in primary school. A 2026 systematic review of studies involving children and early adolescents reported broad support for the structure of basic human values in younger populations and noted developmental changes in value priorities during childhood [9]. Longitudinal evidence from early elementary education also shows reciprocal relationships between children's values and classroom behavior; in particular, self-transcendence values such as benevolence and universalism can develop alongside supportive forms of behavior [10]. These findings challenge the assumption

that values education should be postponed until adolescence. Primary-school children already differentiate values, express value preferences and connect them with behavior, although their reasoning remains strongly influenced by concrete situations, adult models and immediate social relations.

The second theoretical foundation concerns moral competence. The Four Component Model associated with Rest and later work by Bebeau and Narvaez explains moral action through at least four interacting processes: moral sensitivity, moral judgment, moral motivation and moral character or implementation [11]. This model is important because knowledge of a rule alone does not guarantee ethical action. A child may know that excluding a classmate is wrong yet fail to notice the classmate's emotional state, may understand the harm but prioritize peer approval, or may intend to act fairly but lack the confidence to intervene. For primary education, moral choice competence should therefore combine recognition, evaluation, motivation and action rather than be reduced to verbal reproduction of moral norms. Althof and Berkowitz likewise argue that moral and character education should be treated as complementary dimensions of citizenship formation rather than as competing traditions [12].

Research on school-based values and character education supports an integrated pedagogical approach. A systematic review of primary-school teachers' beliefs found strong support for curriculum integration and teacher role modelling, with respect and responsibility among the most frequently emphasized values [13]. Berkowitz's review of effective values education identifies interactional practices, professional development, parental involvement, role modelling and opportunities for responsible action as recurring elements of successful school approaches [14]. Experimental work with fourth-grade students has also shown that carefully designed activities around hospitality can increase tendencies related to respect, love and tolerance, illustrating that culturally familiar value content can produce broader prosocial outcomes when pedagogically structured [15]. Qualitative research with primary-school students indicates that teachers remain a major source of value learning, which increases the importance of moving beyond direct explanation toward participatory methods [16].

The literature also cautions against treating values education as a list of slogans. School-based moral education tends to be more effective when values are embedded in the ordinary social and instructional life of the school rather than confined to isolated lessons [17]. Lickona's principles of effective character education similarly emphasize shared ethical values, caring community, meaningful opportunities for moral action, integration with the academic curriculum and systematic evaluation [18]. These findings suggest that the integration of national and universal values should be designed as an environment for guided moral decision making, not as parallel memorization of two categories of values.

RESEARCH METHODOLOGY

The study uses a theoretical-analytical research design. Its methodological basis combines axiological analysis, comparative interpretation, conceptual synthesis and qualitative content analysis of scholarly and policy sources. The analytical corpus includes: constitutional and regulatory documents of the Republic of Uzbekistan concerning national and universal values in education; UNESCO normative and pedagogical documents on global citizenship, peace, human rights and cultural diversity; foundational theories of human values and moral action; and recent peer-reviewed studies on values education, character education and value development in primary-school-age children.

The analysis followed three stages. First, value concepts were grouped according to their pedagogical function rather than their formal label. This made it possible to compare culturally specific expressions such as respect for elders, family responsibility, hospitality, community solidarity, patriotism and preservation of cultural heritage with universal ethical principles such as human dignity, justice, equality, empathy, tolerance, solidarity, non-discrimination and responsibility. Second, the psychological processes required for moral choice were synthesized from moral competence and value-development literature. Third, a pedagogical model was constructed by matching value content with age-appropriate learning activities that require students to recognize a moral issue, consider perspectives, evaluate alternatives, justify a choice and act consistently with the chosen principle.

The proposed model is conceptual rather than experimental. Accordingly, the results reported below should be understood as theoretically grounded pedagogical propositions that require subsequent empirical validation in primary-school settings. This limitation is methodologically important because it separates the construction of a model from claims about its measured effectiveness.

RESULTS AND DISCUSSION

The theoretical synthesis produced four interrelated findings. First, national and universal values are pedagogically productive when treated as two levels of one moral orientation system: national values provide cultural meaning and identity, whereas universal values provide criteria for ethical generalization beyond the immediate group. Second, moral choice competence is multidimensional and cannot be reduced to knowledge of norms. Third, value integration requires situations of choice in which students actively compare motives, consequences and responsibilities. Fourth, the teacher's role shifts from transmitting ready-made judgments to designing a moral learning environment in which culturally grounded examples are discussed through universally defensible ethical criteria.

1. National and universal values as complementary levels of moral orientation

A frequent conceptual error in values education is to present national and universal values as two separate lists. Such a model encourages memorization but does not explain what a child should do when values appear to conflict. An integrative approach begins from the idea that cultural traditions provide the first language through which children understand duty, care, respect and belonging, while universal ethical principles help them extend these meanings to people outside their immediate family, community or nation. In this sense, integration is not the elimination of cultural difference; it is the development of the ability to interpret cultural values in a manner compatible with human dignity and the rights of others [4, 6].

For example, respect for elders is culturally meaningful as a form of gratitude, continuity and recognition of experience. In moral choice education, however, respect should not be equated with uncritical obedience. It can be integrated with the universal values of human dignity, fairness and personal responsibility by teaching children to listen respectfully, explain disagreement without humiliation and reject actions that harm another person. Likewise, hospitality and community solidarity can be expanded from in-group generosity toward inclusive empathy and assistance regardless of a person's background. Patriotism can be taught as responsible care for one's country, language, heritage and public good while remaining compatible with respect for other peoples, cultures and humanity as a whole.

Table 1. Pedagogical matrix for integrating national and universal values

National-cultural orientation	Universal ethical correlate	Moral-choice outcome	Recommended learning situation
Respect for elders and teachers	Human dignity; mutual respect; fairness	Respectful disagreement; distinguishing authority from moral justification	Age-appropriate dilemma involving an unfair request by an older person
Family responsibility and care	Care; rights; responsibility; equality	Balancing duty to family with fairness to self and others	Role-play on sharing responsibilities and resolving competing obligations
Hospitality and mahalla/community solidarity	Empathy; solidarity; non-discrimination	Extending help beyond the familiar group	Story discussion about helping a newcomer or socially excluded peer
Patriotism and cultural heritage	Respect for cultural diversity; global responsibility	Positive national identity without devaluing other cultures	Comparison of national traditions with traditions of other peoples
Honesty and conscientiousness	Integrity; justice; accountability	Choosing truth despite immediate personal benefit	Dilemma about cheating, found property or concealing a mistake
Collective harmony and cooperation	Peace; tolerance; dialogue	Managing conflict without humiliation or exclusion	Cooperative task requiring negotiation among different viewpoints

2. Structural components of moral choice competence

Based on the Four Component Model of moral action [11] and age-specific characteristics of primary-school learning, moral choice competence can be operationalized through four mutually connected components. The axiological-cognitive component includes knowledge of value meanings, recognition of a moral problem and differentiation between a rule, a preference and an ethical principle. The emotional-empathic component includes awareness of feelings, perspective taking and sensitivity to how alternative actions affect other people. The reflective-evaluative component includes comparison of alternatives, anticipation of consequences, identification of value conflicts and justification of a decision. The behavioral-choice component includes willingness and ability to act on the decision, accept responsibility, revise behavior after reflection and maintain consistency between stated values and conduct.

These components are intentionally formulated in a developmental rather than philosophical vocabulary. A primary-school student does not need abstract ethical theory to demonstrate competence. A child can show moral sensitivity by noticing that someone is being excluded, moral evaluation by explaining why the exclusion is unfair, moral motivation by preferring inclusion even when peers disagree, and behavioral competence by inviting the excluded child into an activity. The pedagogical task is to make these processes visible, repeatable and progressively more independent.

Table 2. Components and observable indicators of moral choice competence

Component	Core ability	Observable indicators in primary school
Axiological-cognitive	Recognize moral meaning and relevant values	Names the problem; identifies affected persons; distinguishes fair/unfair or caring/harmful alternatives; connects a choice to a value
Emotional-empathic	Understand perspectives and emotional consequences	Recognizes another person's feelings; considers more than one viewpoint; expresses empathy without stereotyping
Reflective-evaluative	Compare alternatives and justify a decision	Explains reasons; predicts consequences; identifies value conflict; can revise a judgment after discussion
Behavioral-choice	Translate judgment into responsible action	Chooses and performs a prosocial action; resists peer pressure; accepts consequences; reflects on the outcome

3. Pedagogical mechanisms of value integration

The first mechanism is the use of moral dilemmas constructed from situations familiar to children. A productive dilemma should contain at least two understandable alternatives and a genuine value tension. Examples may involve loyalty to a friend versus honesty, obedience versus fairness, personal success versus helping a peer, or protecting a group's reputation versus acknowledging harm. The purpose is not to force one-word answers but to train students to identify values, consider affected persons and justify a decision. Discussion should move from 'What rule was broken?' to 'Who may be affected?', 'Which values are involved?', 'What might happen after each choice?' and 'Can the same decision be fair to everyone?'

The second mechanism is culturally embedded narrative. Folktales, family stories, proverbs, biographies of historical figures and episodes from local community life can provide emotionally meaningful material for moral interpretation. Their educational value increases when they are not treated as unquestionable examples but as prompts for reflective dialogue. Students can compare a character's action with alternative actions, identify which values are protected, and examine whether a culturally admired behavior also satisfies criteria of fairness, care and respect. This method allows national heritage to function as a living source of moral inquiry rather than as decorative content.

The third mechanism is perspective taking. Universal values become meaningful when children learn to apply them beyond the boundaries of the familiar group. Teachers can ask students to retell the same event from the viewpoint of a newcomer, a younger child, a person from another culture or the person disadvantaged by the majority's decision. UNESCO's primary-level guidance emphasizes respect for difference, good relationships, empathy, solidarity, tolerance and peaceful conflict resolution [5]. These outcomes are strengthened when students repeatedly practice seeing how the same action appears from different social positions.

The fourth mechanism is cooperative moral action. Values are internalized not only through discussion but also through organized practice. Classroom responsibilities, peer assistance, group projects, care for shared resources and community-oriented activities provide low-risk opportunities for children to make decisions with real consequences. Research on effective values education repeatedly points to the importance of interaction, role modelling and opportunities for responsible participation [14, 17, 18]. In the Uzbek context, cooperation among school, family and mahalla can extend such practice beyond the classroom while maintaining consistent expectations [2].

The fifth mechanism is reflective assessment. Moral choice competence should not be assessed through a single 'correct answer' test. More informative evidence can be obtained through short written or oral explanations of dilemmas, teacher observation, student self-reflection, peer feedback and portfolios containing examples of value-based decisions. Assessment criteria should focus on the quality of reasoning and responsibility: whether the student notices affected people, names relevant values, considers consequences, justifies the decision, respects alternative viewpoints and acts consistently. Such criteria reduce the risk of rewarding socially desirable phrases without understanding.

4. Conditions for effective implementation in primary education

The proposed model requires several pedagogical conditions. First, teachers need conceptual clarity about the difference between transmitting norms and developing moral judgment. Direct explanation remains useful for introducing vocabulary and boundaries, but it should be followed by dialogue and application. This is particularly important because primary-

school students themselves often report teachers as a primary source of values and direct explanation as a common method [16]. Second, classroom climate must allow respectful disagreement. A child cannot develop moral choice competence if every disagreement with the majority or an adult is treated as disobedience. The teacher should model how to question reasons without humiliating persons.

Third, the values selected for instruction should be coherent across curriculum, school culture and adult behavior. A lesson on justice loses credibility if classroom procedures are perceived as arbitrary; a lesson on respect is weakened when ridicule is tolerated; a lesson on responsibility is weakened if adults do not acknowledge their own mistakes. The teacher therefore functions not only as a source of information but as a model of value-consistent decision making [13, 18]. Fourth, parents and community actors should be involved through concrete shared practices rather than only ceremonial events. Family discussions of everyday moral situations, intergenerational stories, community service and joint reflection can connect national cultural experience with school-based moral reasoning.

Fifth, age appropriateness must guide the complexity of moral choice tasks. In grades 1–2, situations should be short, concrete and emotionally transparent, focusing on care, honesty, sharing, inclusion and responsibility. In grades 3–4, dilemmas can include conflicting duties, group pressure, fairness, cultural difference and the distinction between intention and consequence. This developmental progression corresponds with evidence that values become increasingly differentiated during middle childhood and that school context participates in their development [9, 10].

5. The integration model as a response to globalization

Globalization does not simply introduce ‘foreign values’; it multiplies the number of moral reference points available to children. The educational risk is therefore two-sided. One risk is cultural fragmentation, in which national traditions lose explanatory meaning and are replaced by rapidly changing media norms. The opposite risk is defensive traditionalism, in which cultural loyalty is presented as requiring rejection of difference or unquestioning conformity. An integrative model avoids both extremes. It treats cultural identity as a resource for moral development while requiring that actions be evaluated through criteria that can be justified beyond the boundaries of one group.

This approach is consistent with the logic of UNESCO’s locally grounded global citizenship education [6] and with Uzbekistan’s constitutional commitment to national and universal values [1]. For primary-school pedagogy, the key outcome is not a child who can recite two categories of values, but a child who can make increasingly independent choices such as telling the truth despite peer pressure, showing respect without accepting injustice, helping someone outside the familiar group, protecting cultural heritage without disparaging another culture, and accepting responsibility for the consequences of a decision. In this sense, integration becomes an educational mechanism for forming culturally rooted and ethically open moral agency.

CONCLUSION

The integration of national and universal values is a strategically important direction for developing moral choice competence among primary school students. The analysis demonstrates that these values should not be conceptualized as competing systems. National values provide children with culturally meaningful forms of belonging, continuity, respect, responsibility and collective memory, while universal values enable them to generalize moral concern through principles of dignity, justice, equality, empathy, tolerance, solidarity and respect for diversity.

Their pedagogical integration becomes meaningful when values are used as criteria for choosing and justifying action rather than as material for memorization.

Moral choice competence can be represented through four interrelated components: axiological-cognitive, emotional-empathic, reflective-evaluative and behavioral-choice. The development of these components requires a combination of culturally embedded narratives, moral dilemmas, dialogic discussion, perspective taking, cooperative action, teacher modelling and reflective assessment. The proposed model also presupposes coherence among curriculum, classroom climate, family practices and community expectations.

For educational practice, three conclusions are especially significant. First, every values-oriented lesson should contain an element of choice, justification or reflection. Second, national cultural material should be connected with universal ethical questions rather than presented only as historical information. Third, assessment should focus on the student's ability to recognize a moral problem, consider different perspectives, justify a decision and take responsibility for action. Future research should empirically test the proposed model through age-specific diagnostic criteria, experimental teaching materials and longitudinal observation of changes in students' moral reasoning and behavior.

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PSYCHOLOGICAL MECHANISMS FOR DEVELOPING STUDENTS' INTELLECTUAL AND CREATIVE ABILITIES

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Abstract. *This article examines the psychological mechanisms underlying the development of students' intellectual and creative abilities, the characteristics of creative thinking, and the theoretical foundations of organizing creative activity. In particular, it analyzes Graham Wallas's four-stage model of the creative process and Joy Paul Guilford's views on creative thinking. The article identifies psychological conditions that promote independent thinking, the analysis of problem situations, the generation of unconventional solutions, sensitivity to new ideas, and intellectual engagement among students. It also substantiates the interrelationship between motivation, cognitive flexibility, reflection, independence, and volitional qualities in the development of intellectual and creative abilities.*

Keywords: *intellectual and creative abilities, creative thinking, psychological mechanisms, Graham Wallas's model, Joy Paul Guilford, divergent thinking, independent thinking, reflection.*

In the modern higher education system, enhancing students' intellectual potential, developing their creative thinking, and fostering their ability to find independent solutions to complex problems are among the important psychological and pedagogical tasks. In today's information-oriented society, acquiring knowledge alone is no longer sufficient. There is an increasing need to apply knowledge in new situations, critically evaluate existing perspectives, analyze problems from different viewpoints, and propose original ideas.

Intellectual and creative ability is a complex psychological construct that integrates an individual's capacity to acquire knowledge, analyze information, draw logical conclusions, understand problem situations, and generate new ideas. This ability develops through the interaction of intellectual activity and creative exploration. The need for knowledge, intrinsic motivation, imagination, cognitive flexibility, reflective analysis, independence, and volitional qualities play an important role in its development.

The process of developing students' intellectual and creative abilities cannot be limited to providing knowledge or forming specific skills. It requires activating students' cognitive activity, encouraging independent exploration, identifying new connections between existing knowledge, and expanding their capacity to consciously regulate their own activities. Therefore, studying the mechanisms underlying the development of these abilities from a psychological perspective is of both theoretical and practical significance.

Intellectual and creative ability develops through the interaction of intellectual operations and creative thinking processes. The intellectual component encompasses the ability to perceive, retain, analyze, compare, and generalize information and draw logical conclusions. The creative component, in turn, involves using existing knowledge in unconventional ways, developing alternative solutions, generating new ideas, and approaching problems from original perspectives.

The development of these abilities depends not only on an individual's cognitive processes but also on motivational and volitional characteristics. In particular, the desire to acquire new knowledge, interest in challenging tasks, the ability to perceive failure as an opportunity for development, and a willingness to persist in an activity contribute to the continuity of creative exploration.

The following psychological mechanisms can be distinguished in the development of intellectual and creative abilities:

1. **Motivational mechanism** — activates students' need for knowledge, intrinsic interest, and desire to achieve new results.
2. **Cognitive mechanism** — supports information analysis, comparison, generalization, problem identification, and the development of alternative solutions.
3. **Associative mechanism** — facilitates the establishment of new connections between previously acquired knowledge, experiences, and mental representations.
4. **Reflective mechanism** — enables students to analyze their thinking, decisions, and activity outcomes, recognize errors, and improve their subsequent actions.
5. **Volitional mechanism** — supports overcoming difficulties, pursuing goals consistently, and bringing creative exploration to completion.
6. **Social and communicative mechanism** — facilitates the generation of new ideas through the exchange of opinions, group discussions, peer assessment, and comparison of different perspectives.

These mechanisms do not operate independently but function as an integrated system. For example, intrinsic motivation encourages students to engage with challenging tasks, while cognitive and associative processes support the search for different solutions. Reflection helps evaluate the validity of a chosen solution, whereas volitional qualities facilitate its implementation.

The four-stage model proposed by the English psychologist Graham Wallas in 1926 is of considerable theoretical importance in explaining the psychological characteristics of the creative process. This approach describes the formation of creative ideas through four stages: preparation, incubation, illumination, and verification.

The first stage — preparation. At this stage, students understand the nature of the problem, activate their existing knowledge, collect the necessary information, and explore possible ways of solving the task. Psychologically, this process is characterized by goal-directed attention, the identification of connections between different areas of knowledge, and the analysis of the problem situation. In higher education, problem-based questions, research assignments, case studies, and independent investigations can contribute to an effective preparation stage.

The second stage — incubation. This stage involves the indirect processing of thoughts related to a problem when direct work on it temporarily slows down or stops. When students take a temporary break from a problem, connections between previous knowledge and newly acquired information may be reorganized. However, incubation does not necessarily mean that a solution will always emerge unconsciously. Its effectiveness depends on the extent to which the problem has been explored beforehand, the individual's experience, and the characteristics of the situation.

The third stage — illumination. At this stage, a possible solution or a new idea may suddenly become apparent. Psychologically, this is characterized by the emergence of new connections between previously unrelated pieces of knowledge, the consideration of a problem from an unconventional perspective, and the development of a new direction in thinking. To facilitate such experiences among students, it is important to encourage free thinking, the

formulation of hypotheses, experimentation with different alternatives, and a willingness to make mistakes without excessive fear.

The fourth stage — verification. At this stage, the proposed idea is evaluated from logical, theoretical, or practical perspectives. Students examine the validity of the solution, identify its advantages and limitations, and refine it when necessary. In this way, a creative idea can be transformed into a result with practical value.

Wallas's model should not be interpreted as suggesting that creative activity always follows a rigid and identical sequence. Rather, it is a theoretical approach that explains the essential stages of creative exploration. In practice, these stages may alternate, recur, or overlap with one another.

The significance of this model for developing students' intellectual and creative abilities lies in its demonstration that creative achievement requires not only knowledge and thinking but also time, independent exploration, the processing of ideas, and critical evaluation of results. Furthermore, the model can serve as a methodological foundation for organizing learning activities aimed at developing patience, goal orientation, the ability to substantiate ideas, and a sense of responsibility for the outcomes of one's activities.

The American psychologist Joy Paul Guilford occupies an important place in the study of creativity and intelligence. In his work, divergent thinking — the ability to generate multiple possible answers and solutions to a single problem — is regarded as one of the important indicators of creative activity. Unlike convergent thinking, which focuses on finding one correct answer, divergent thinking involves exploring alternative possibilities and expanding the range of ideas.

Based on Guilford's approach, several important indicators of creative thinking can be identified:

- **Fluency** — the ability to generate numerous ideas and solutions within a given period.
- **Flexibility** — the ability to approach a problem from different perspectives and adapt one's thinking strategies to changing circumstances.
- **Originality** — the ability to propose distinctive ideas that differ from conventional approaches.
- **Elaboration** — the ability to develop an idea in detail, clarify its components, and identify ways to implement it.

These indicators are important for analyzing students' creative thinking and planning developmental activities. However, they should not be regarded as the only criteria that fully represent every aspect of intellectual and creative ability. Students' knowledge, subject-specific experience, motivation, emotional state, and social environment can also influence creative outcomes.

Drawing on Guilford's views, it is advisable to incorporate learning tasks in higher education that encourage students to propose multiple answers to the same question, examine problems from different perspectives, reconsider existing solutions, and support new ideas with evidence.

For example, students may be asked to develop several possible solutions to a particular social or educational problem, compare them in terms of effectiveness and feasibility, and select the most appropriate option. Such activities simultaneously stimulate idea fluency, cognitive flexibility, critical analysis, and decision-making abilities.

The effective development of intellectual and creative abilities is closely associated with students' personal activity and the characteristics of the educational environment. Conditions that

encourage creative thinking should enable students not merely to acquire ready-made information but also to identify problems independently, ask questions, and substantiate their own viewpoints.

First, **the use of problem-based and open-ended situations** is important. Unlike tasks with predetermined answers, open-ended assignments require students to engage in independent exploration and develop alternative solutions. The conditions of the problem should be clearly explained while allowing different approaches to finding a solution.

Second, **encouraging questions and initiative** strengthens creative engagement. When students are able to express their questions freely, clarify existing ideas, and propose alternative perspectives, they participate more actively in cognitive activities. In such an environment, asking questions is viewed not as a sign of insufficient knowledge but as a means of gaining a deeper understanding of a problem.

Third, **developing independent thinking and responsibility for decisions** is essential. Students should be given opportunities to choose methods for solving particular problems, justify their decisions with evidence, and evaluate the results obtained. This process develops independence, self-confidence, and the ability to regulate their activities consciously.

Fourth, **emphasizing independent observation, exploration, and generalization** is necessary. Recording observations, comparing information from different sources, identifying general patterns, and drawing personal conclusions deepen intellectual engagement. Such assignments encourage students to process knowledge independently rather than simply reproduce ready-made conclusions.

Fifth, **creating an environment that supports creative collaboration and the exchange of ideas** is important. Through group discussions, projects, debates, and peer review, students become familiar with different perspectives, learn to substantiate their ideas, and analyze the opinions of others. Group activities should also provide opportunities for every student to make an identifiable individual contribution.

Sixth, **providing opportunities for reflection and constructive feedback** is essential. Students should analyze the methods they used to complete a task, identify which decisions were effective, and consider the difficulties they encountered. Feedback from instructors should not be limited to identifying errors; it should also help students determine ways to improve their future performance.

Seventh, **supporting intrinsic motivation and volitional qualities** is necessary. Creative tasks are not always completed successfully on the first attempt. Therefore, it is important to develop students' willingness to overcome difficulties, continue exploring possibilities, and refine their results. Recognition should be given not only to the final outcome but also to the process of exploration, the strategies employed, and independent initiative.

Based on the theoretical perspectives outlined above, developmental activities for students can be organized around several interconnected areas.

Analysis of problem situations. Students are presented with real or simulated situations and asked to identify the problem, analyze its causes, develop alternative solutions, and justify the most appropriate option. This method develops analytical thinking, independent decision-making, and problem-solving abilities.

Idea-generation exercises. Activities such as identifying different uses for an object, phenomenon, or problem, proposing multiple answers to one question, and reworking existing ideas in new directions activate the indicators of divergent thinking. It is advisable to initially encourage a diversity of ideas and then evaluate them on the basis of evidence.

Project and research activities. Through independent project work, students learn to define problems, collect information, select research methods, analyze findings, and formulate conclusions. These activities connect intellectual and creative processes with practical tasks.

Reflective analysis. After each creative assignment, students can evaluate their own activities, identify the thinking strategies they used, consider which alternative solutions they explored, and determine what they would change in future attempts. This approach supports self-awareness and self-development.

Group discussion and peer assessment. Students can present their ideas, analyze the perspectives of other participants, and refine their proposals. Such activities help develop argumentation, communication, collaboration, and cognitive flexibility.

By integrating these approaches with Wallas's model, learning activities can be organized around the stages of preparation, the processing of ideas, the recognition of new solutions, and the verification of results. Guilford's views on divergent thinking provide a theoretical basis for designing tasks focused on idea generation and the exploration of alternative solutions.

At the same time, evaluating the effectiveness of developmental activities should not be limited to counting the number of ideas or assessing the final result of an assignment. Students' approaches to understanding problems, independence, cognitive flexibility, use of evidence, reflective analysis, and willingness to continue exploring should also be taken into account.

The development of students' intellectual and creative abilities is a multidimensional psychological process in which cognitive, motivational, associative, reflective, volitional, and social-communicative mechanisms operate in an integrated manner. The effective functioning of these mechanisms enables students not only to acquire existing knowledge but also to reinterpret it, generate new ideas, and independently solve problem situations.

Graham Wallas's model, which explains the creative process through four stages, highlights the importance of preparation, the processing of ideas, the recognition of new ideas, and the verification of results. Joy Paul Guilford's views on divergent thinking provide a theoretical foundation for organizing learning activities aimed at developing fluency, flexibility, originality, and elaboration in creative thinking.

To develop students' intellectual and creative potential, it is necessary to use problem-based situations, encourage questioning and initiative, promote independent exploration and creative collaboration, support reflective analysis, and provide constructive feedback. It is also important to establish a psychological environment in which failure in creative activity is perceived as an opportunity to learn and improve.

Overall, activities aimed at developing intellectual and creative abilities should address not only students' levels of knowledge but also their capacity for independent thinking, innovative approaches to problems, analysis of their own activities, and practical substantiation of their ideas. Such an approach makes it possible to integrate intellectual and creative development within higher education.

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METHODS FOR DEVELOPING THE COMPONENTS OF STUDENTS' CREATIVE COMPETENCE IN INDEPENDENT LEARNING

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Abstract. *This article examines pedagogical approaches and procedures for developing students' creative competence through independent learning. It integrates acmeological, systemic, competence-based, person-centered, contextual, andragogical, holistic, and systems-activity perspectives to align individual learning trajectories with professional and creative growth. The proposed framework treats competence development as an ongoing process that cannot be captured adequately by a single final grade. It emphasizes recurrent observation of the frequency of nonstandard solutions, quality of project revisions, critical thinking, and students' engagement in self-improvement. Three interrelated components structure the model: an axiological-motivational component supporting intrinsic motivation and personal goals, a divergent-cognitive component supporting creative problem solving, and a meta-reflective component supporting evaluation and revision. Implementation is organized into four stages: diagnosis of creative potential, design of differentiated learning pathways, practical-creative work supported by coaching and mentoring, and reflective assessment with iterative product refinement. The paper also identifies constraints noted during the research, including insufficient opportunities for creative activity, incompletely formed value orientations, and limited engagement in independent learning. Overall, the framework positions reflection and indicator-based monitoring as mechanisms for making students' progress visible and informing further learning decisions. The proposed system is intended to support transparent, responsive, and sustained development of creative competence.*

Keywords: *independent learning, creative competence, acmeological approach, reflective assessment, individual learning trajectories, pedagogical model*

Theoretical and Methodological Foundations

In our study on the effective development of the components of students' creative competence during independent learning, several leading methodological approaches were identified as priorities: acmeological, systemic, competence-based, person-centered activity-based, contextual, andragogical, holistic, and systems-activity approaches. Integrating these methodological orientations provides a fundamental basis for revealing students' professional and creative potential; tailoring their learning trajectories to individual needs; differentiating educational content by levels of professional development; structuring creative tasks to encourage alternative solutions; improving creative products iteratively through reflective processes; and establishing indicators to track the rate of competence development.

Each approach logically complements the others in enabling students to realize their professional potential. First, the acmeological approach encourages students to work on themselves, aspire to professional excellence, and develop intrinsic motivation. The systemic approach then organizes this process into a coherent system of independent learning. The

competence-based approach enables students to apply acquired knowledge in practice, while the person-centered activity-based approach places students themselves at the center of the process and helps unlock their creative potential. Aligning assessment mechanisms with indicators of the dynamics of competence development is of considerable scientific and methodological importance for improving the monitoring and assessment of students' creative competence.

The sources cited in the study also address forms of independent learning (Halilov, 2002), pedagogical mastery (Chernyavskaya, 1997), problem-modular learning (Choshanov, 1996), and conditions for developing inventive creativity (Sharipov, 2000).

Monitoring the Development of Creative Competence

Aligning assessment mechanisms with indicators of the dynamics of competence development is of considerable scientific and methodological importance for improving the monitoring and assessment of students' creative competence.

This principle suggests that assessing students' creative competence should not be limited to a final grade at the end of a semester or the result of a single test. Because creative abilities do not develop in one day or through one assignment, assessment requires regular monitoring of how those abilities change over time—that is, of their developmental dynamics. To reduce subjectivity, assessment relies on specific indicators, including the frequency with which students generate non-standard solutions, the quality of project revisions, the level of critical thinking, and the degree of engagement in self-improvement. Each indicator provides evidence of the student's rate of development. This approach allows lecturers to see students' results and also enables students to visualize their professional growth trajectories, recognize the stages at which they are falling behind, and manage their own learning independently. Linking assessment mechanisms to the dynamics of competence development thus involves continuously measuring growth in creative potential through clearly defined indicators and, on that basis, seeking to ensure the effectiveness of education.

From a pedagogical perspective, "aligning assessment mechanisms with indicators of the dynamics of competence development" means adapting assessment to continuously monitor changes in the rate of a student's creative growth over a specified period by means of precise indicators and an indicator system, rather than evaluating knowledge only through a one-time final score or fixed criteria.

In connecting these approaches to practice, the contextual approach brings learning tasks closer to real professional environments, while the andragogical approach increases students' responsibility for independent work and teaches them to think like mature professionals. To achieve the intended outcomes and shape individualized creative development trajectories, all resources and goals are harmonized according to the principle of holism. Ultimately, the interrelationship among these approaches is strengthened by the systems-activity principle and by differentiating educational content according to levels of creative activity. Together, these measures form a fundamental basis for learning through independent and creative inquiry rather than memorizing ready-made knowledge. This is achieved by structuring creative tasks to generate alternative solutions, iteratively revising creative products through reflective processes, and tracking the dynamics of competence development using indicators.

Structure and Components of the Pedagogical Model

One of the principal objectives of our research is to implement such a pedagogical model in practice. To clarify the meaning of the category "development," we drew on the pedagogical definition associated with X. A. To'raqulov (as presented in Hasanboyev et al., 2009). According

to this scholar, development is a purposeful pedagogical process that ensures students acquire certain personal and professional qualities. New competencies are acquired through the learner's own activity. Activating students' creative competencies within an independent learning environment is closely connected with targeted efforts to increase their professional responsibility and engagement.

When subjecting the model to experimental testing, we consider it as a systemic and structural framework. According to theoretical perspectives on modeling, this process aims to identify the properties of the object under study, improve it, and rationalize new solutions. The developed didactic model establishes a clear sequence for the educational process by configuring goal-and-outcome blocks to match individual creative development trajectories and differentiating educational content according to levels of creative activity. It thereby seeks to ensure expected outcomes against criterion-based indicators. The concept of a "model" highlights its function as a means of understanding objects and processes. Within our research, the model's principal cognitive function is to serve as a sustainable source of creative inquiry and professional growth for students by structuring creative tasks to generate alternative solutions, iteratively revising creative products through reflective processes, and tracking the dynamics of competence development through indicators.

The acmeological system designed to develop students' creative competence includes the following functional components. The axiological-motivational component is characterized by students' intrinsic need for creative self-development, their recognition of independent learning programs as valuable, and their formation of individual learning trajectories. The divergent-cognitive component draws on a combination of contemporary theoretical knowledge and practical skills to design creative activities in primary education and address problematic situations. The meta-reflective component enables critical evaluation of the pedagogical process, diagnosis of outcomes, and determination of students' levels of creative growth. The methodology for developing students' creative competence has been improved by directing reflective processes toward the revision and correction of creative products.

This finding shows that students' ability to consciously analyze and evaluate their own actions is crucial to advancing their creative activity to a higher level. Rather than leaving an initial creative product unchanged, students revise it on the basis of self-analysis and reflection, correct mistakes, and raise its quality to a new level. In this process, reflection is not merely a form of observation; it becomes a means of correcting practical activity. As a result, students steadily acquire skills for continuously improving their creative competence by critically evaluating their work, promptly identifying shortcomings, and addressing them.

According to Sayidaxmedov's (2003) discussion of functional processes, the developmental factor in an acmeological system consists of the new qualities and achievements that emerge in a student's creative activity. These innovations enhance specialists' creativity. During our research, we identified several difficulties in developing students' creative competence, including an insufficient pedagogical environment for creative activity, inadequately developed value-based attitudes, and low levels of engagement in independent learning.

Implementation Stages and Assessment

On this basis, a system of pedagogical conditions aimed at enhancing students' creative competence in independent learning was developed. The process comprises four closely interconnected stages. First, the diagnostic stage identifies students' creative potential. Second, the design stage differentiates educational content and adapts it to individual learning trajectories.

Third, the practical-creative stage structures assignments and applies coaching and mentoring methods. Finally, at the reflective-assessment stage, creative products are iteratively revised through reflective processes, and developmental dynamics are monitored continuously using indicators. The system for developing students' creative competence was thus improved by aligning its assessment mechanism with the dynamics of competence development through measurable indicators.

The four stages described above are summarized in Table 1. The monitoring column synthesizes the intended evidence of development at each stage rather than reporting an additional data collection instrument.

Table 1

Four Stages of the Proposed Creative-Competence Development Model

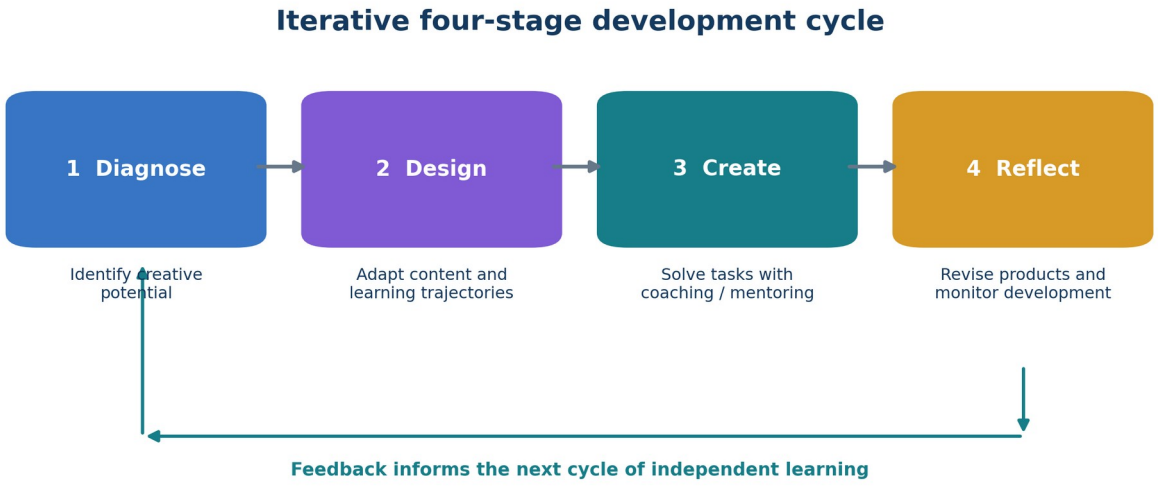
Stage	Primary pedagogical activity	Focus of observation or reflection
Diagnostic	Identify individual creative potential and learning needs.	Starting capabilities and developmental needs.
Design	Differentiate content and configure personal learning pathways.	Alignment of tasks and trajectories with learner needs.
Practical–creative	Engage in structured creative tasks with coaching and mentoring.	Alternative solutions, engagement, and task performance.
Reflective–assessment	Revise creative products iteratively and monitor progress.	Quality of revisions, critical reflection, and developmental change.

Note. Conceptual synthesis of the four connected implementation stages described in the article; no effect sizes or participant counts were supplied.

Figure 1 depicts the four stages as an iterative process in which reflective feedback can guide subsequent independent-learning activities.

Figure 1

Iterative Pedagogical Cycle for Developing Creative Competence



Note. Original conceptual illustration based on the four implementation stages described in the paper; arrows indicate intended feedback, not quantified causal effects.

Discussion and Implications

This finding shows that the effectiveness of a pedagogical system intended to foster students' creative potential depends not only on traditional final grades but also on the extent to which monitoring and assessment mechanisms employ meaningful indicators. The approach enables continuous measurement of the development of students' creative competence over time using clearly defined indicators established in advance. Within this system, adapting assessment mechanisms to the dynamics of competence development allows students to see their own rate of growth, correct shortcomings promptly, and manage the pedagogical process according to their individual needs. The mechanism is intended to ensure objectivity, transparency, and a sound scientific and methodological basis for the development of creative competence.

Conclusion

The proposed pedagogical model integrates motivational, cognitive, and meta-reflective components with differentiated independent-learning tasks and ongoing assessment. Its four-stage sequence emphasizes identifying students' creative potential, adapting learning trajectories, supporting creative activity, and revising products through reflection. Indicators of solution generation, product improvement, critical thinking, and engagement are intended to make changes in competence visible over time. The framework offers an approach to formative monitoring and professional–creative development; the article does not report quantitative effect estimates.

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METHODS OF DEVELOPING THE PROFESSIONAL ACTIVITY OF HIGHER EDUCATION FACULTY THROUGH DIGITAL TECHNOLOGIES

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Abstract. *Today, in the context of the formation of the digital educational ecosystem, one of the urgent scientific tasks is the development of innovative diagnostic mechanisms that ensure a reliable and objective assessment of the professional activities of educators. This article theoretically and practically substantiates the multimodal diagnostic model for assessing the professional activities of educators. During the study, evaluation criteria and indicators were developed based on the integration of competency-based, systemic, activity-based, and digital pedagogical approaches. The opportunities for comprehensive monitoring of teachers' professional development based on artificial intelligence technologies, electronic portfolios, learning management systems (LMS), video lesson analysis, and digital traces of activity were also highlighted. The "MuhandislikWeb" information system and the "Engineers' Accounting" module developed by the author allow for the automation of the assessment process and an increase in the reliability of diagnostic results.*

Keywords: *digital analysis of teacher activity, professional development diagnostics, multi-criteria assessment, digitalization of education.*

Introduction.

The rapid penetration of digital transformation processes into the education system necessitates the fundamental improvement of mechanisms for organizing, managing, and evaluating the professional activities of teaching staff. As a result of the transition to the digital ecosystem of education, educators are required to possess new professional competencies, such as not only mastering the content of a subject perfectly but also effectively applying digital technologies for pedagogical purposes, designing the educational process in a person-centered manner, and analyzing learning outcomes through modern diagnostic tools [2]. These changes require a revision of traditional methods for assessing the professional performance of educators and enriching them with scientifically grounded approaches integrated with digital technologies.

In recent years, the development of technologies such as artificial intelligence, educational analytics (Learning Analytics), electronic portfolios, learning management systems (LMS), digital footprints (Digital Footprint), and multimodal data analysis has significantly expanded the possibilities for comprehensive assessment of teacher performance [2]. These tools serve to form objective information about the dynamics of a teacher's professional development, innovative activity, digital competence, communicative culture, and reflective activity [6]. Therefore, in modern pedagogical research, organizing the assessment process based on the integration of information from various sources into a unified diagnostic system is recognized as one of the relevant scientific directions.

Supporting the professional development of educators and ensuring the sustainable quality of educational results requires the reorganization of the assessment system based on modern scientific approaches and the improvement of diagnostic methods. In this regard, the development of digital platforms that ensure the transparency, objectivity, continuity, and reliability of results is of particular importance. In particular, implementing multimodal diagnostic approaches into practice, which allow for the monitoring and analysis of various aspects of a teacher's activity within a unified information environment, is one of the important factors in managing the quality of education.

This study is dedicated to the development of a multimodal diagnostic model for assessing the professional performance of teaching staff and its practical implementation based on digital educational technologies. Additionally, based on the capabilities of the "MuhandislikWeb" information system created by the author and its «Engineering Accounting" module, methodological solutions were proposed for monitoring teacher activity, automated processing of diagnostic results, and the formation of an individual professional development trajectory.

Literature review.

Scientific research aimed at analyzing and evaluating a teacher's professional activity based on reliable criteria is currently recognized as one of the priority research areas inextricably linked to the quality of education, management efficiency, and the development of digital educational infrastructure. As a result of the widespread implementation of digital transformation processes into the education system, it has become evident that traditional assessment criteria are insufficient to fully characterize the modern professional activity of a teacher. For this reason, in recent years, new conceptual approaches have been forming in scientific research based on the use of competency assessment, digital competence, educational analytics, multimodal diagnostics, and artificial intelligence technologies.

International studies emphasize that a teacher's professional activity is evaluated not only by learning outcomes [6], but also through indicators such as integrating digital technologies into the educational process, implementing innovative pedagogical activities, establishing effective digital communication with students, and ensuring continuous professional development [5]. From this perspective, the DigCompEdu, TPACK, and SAMR models are recognized as methodological foundations serving the comprehensive analysis of a teacher's digital competence. However, these models are more focused on describing competencies and do not fully cover the issues of comprehensive diagnostics of professional activity based on multimodal data.

An analysis of domestic and foreign scientific sources shows that tests, surveys, expert assessments, and observation methods are still widely used in evaluating teacher performance. Although these tools provide a certain understanding of the teacher's professional training, they limit the possibility of continuous monitoring of the dynamics of real pedagogical activity, activity in the digital environment, and changes occurring in the educational process. As a result, there is a need to integrate data from various sources into a single diagnostic system to increase the objectivity and reliability of the assessment process.

In recent years, the concept of educational analytics (Learning Analytics) has expanded the possibilities of processing large volumes of data regarding the activities of teachers and students, their visual analysis, and their application in management decision-making. The integration of analytical tools based on LMS platform statistics, electronic portfolios, video lesson recordings, digital footprints, and artificial intelligence creates new scientific and practical opportunities for assessing teacher performance [5].

This approach, along with increasing the accuracy of assessment results, also serves to identify the individual developmental needs of the educator. At the same time, in existing scientific works, insufficient attention has been paid to the mechanisms of automated processing of multimodal diagnostic data in a unified information system, comprehensive analysis of results, and the formation of an individual professional development trajectory when evaluating the professional activities of educators.

Research methodology.

The study is devoted to the development of the theoretical and methodological foundations for assessing the professional activities of teaching staff based on digital educational technologies and the practical implementation of a multimodal diagnostic model [4]. The research methodology is based on the integration of scientific approaches in the fields of modern pedagogy, educational management, digital pedagogy, and educational analytics. Systemic, competency-based, activity-oriented, axiological, and digital transformation approaches were used as a methodological basis.

The systematic approach made it possible to analyze the professional activity of a teacher as a set of interconnected components. Based on this approach, the interaction of motivational, cognitive, technological, communicative, and reflexive components was evaluated, as well as their impact on professional development.

In the implementation of the research methodology, a comprehensive approach was applied, relying on the harmony of theoretical and practical research methods. At the theoretical stage, methods of critical study of scientific sources on the topic, comparative analysis, systematic generalization, and conceptual modeling were used. At the empirical stage, methods of observation, questionnaire, expert assessment, pedagogical experiment, electronic portfolio analysis, study of statistical data generated on LMS platforms, and video lesson expertise were applied. To ensure the reliability of the obtained results, quantitative and qualitative analysis methods were used comprehensively.

The multimodal diagnostic approach was chosen as the primary methodological principle of the study. This approach allowed for the collection, integration, and interconnected analysis of information about the teacher's professional activity from various sources. In addition to traditional assessment tools, the diagnostic process utilized electronic portfolio, LMS platform statistics, video lesson analysis, digital activity traces, and artificial intelligence-based monitoring results. This allowed for a comprehensive assessment of the dynamics of the teacher's professional development rather than individual performance indicators.

At the practical stage of the study, the capabilities of the “MuhandislikWeb” information system developed by the author and the «Engineering Accounting” module within its structure were utilized. This platform allows for the automated collection, processing, storage, and visual analysis of data regarding the activities of educators, thereby increasing the objectivity and reliability of assessment results. The created platform contributed to increasing the efficiency of educational institution management by consolidating indicators related to the professional activities of educators in a single information environment, their analytical processing, and determining development prospects. The reliability of the research results is ensured by the mutual compatibility of methods, the mutual verification of data obtained from various sources, the comparative analysis of experimental work results, and the scientific validity of evaluation criteria. This methodological approach allowed for a comprehensive assessment of the theoretical validity and practical effectiveness of the developed multimodal diagnostic model [3].

Analysis and discussion of results.

The results of the experimental work showed that the use of a multimodal diagnostic approach in assessing the professional performance of teaching staff ensures high efficiency compared to traditional assessment methods. During the study, information regarding the professional activities of educators was collected from various sources and analyzed by integrating it into a unified information environment. As a result, the objectivity of the assessment process has increased, and the possibility of regular monitoring of the dynamics of professional development of teachers has been created.

Analysis has shown that an approach based solely on testing or expert evaluation cannot fully reflect all aspects of a teacher's activity. On the contrary, the combined use of electronic portfolio, LMS platform statistics, video lesson expertise, digital activity traces, and analytical data formed on the basis of artificial intelligence allowed for a multi-criteria assessment of the teacher's professional competencies. This approach not only increased the reliability of the results but also significantly reduced the influence of subjective factors in the assessment.

The developed multimodal diagnostic model based on the experimental results made it possible to comprehensively evaluate the teacher's activity in five main areas: motivational-value, cognitive, activity-technological [6], and communicative-reflexive criteria. Each criterion was characterized by a system of specific indicators, and their combined analysis served to determine the level of professional development of the educator. This approach made it possible to interpret the evaluation results not only as a final indicator but also as analytical information reflecting development dynamics.

One of the important results of the study was the confirmation of the practical effectiveness of the “MuhandislikWeb” information system developed by the author and the «Engineering Accounting” module within its structure. Through this platform, the automated collection, processing, and analysis of data regarding the professional activities of educators has been established. The system made it possible to visualize assessment results, monitor individual development indicators, and generate analytical data necessary for making management decisions.

Analysis of the results showed that combining digital technologies with pedagogical activity has a positive impact on increasing the innovative activity of educators, developing an electronic communication culture, and strengthening professional reflection skills.

The results obtained demonstrated their compatibility with the concepts of digital competence and educational analytics put forward in international research. However, the distinguishing feature of this study is that the evaluation of the teacher's performance was carried out not through individual tools, but through the integration of multimodal data into a unified information system. This approach not only improved the quality of diagnostics but also allowed for the development of scientifically grounded recommendations for managing the professional development of educators.

Table 1. Results obtained at the beginning of the experiment

	Namangan State Technical University		**“Tashkent Institute of Irrigation and Agricultural Mechanization Engineers”**		**Bukhara State Technical University**	
	In the experimental group	In the control group	In the experimental group	In the control group	In the experimental group	In the control group

2	6	7	8	8	8	8
3	22	23	22	23	23	24
4	27	26	23	21	22	21
5	7	8	4	5	5	5
	Total					
		2	3	4	5	∑
In the experimental group		22	67	72	16	177
In the control group		23	70	68	18	179

Based on this table, the final result of the experimental results is presented in the histogram in Figure 1.

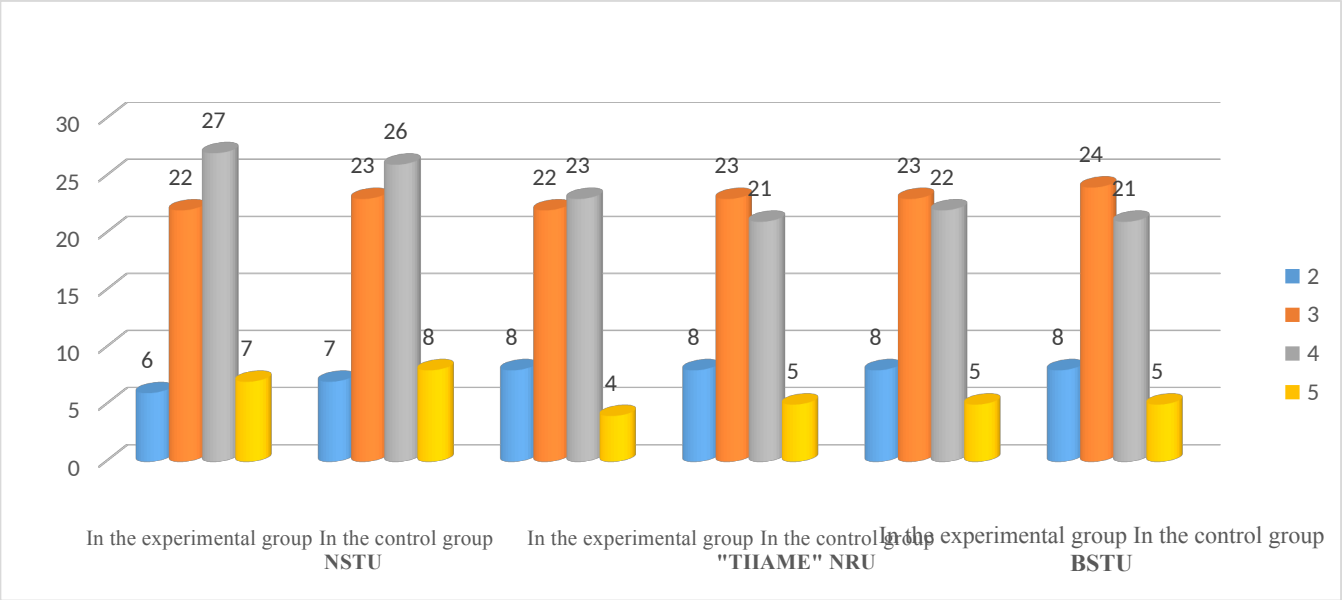


Figure 1. Diagram of the results at the end of the experiment.

Based on the results of the conducted surveys and analyses, it can be stated that several data collection methods were applied during the multimodal diagnostics process. Specifically, diagnostic tests for educators, electronic questionnaires, activity logs in LMS systems, electronic portfolios, expert assessment cards, and self-assessment questionnaires were used. The integration of this data made it possible to draw an objective and reliable conclusion about the teacher's activities.

Conclusions and suggestions.

The results of the conducted research showed that traditional approaches to assessing the professional performance of teaching staff do not fully meet the requirements of the modern digital educational environment. The widespread introduction of digital technologies, educational analytics, and artificial intelligence tools into the educational process necessitates the improvement of content, criteria, and methods for evaluating teacher performance [5]. From this perspective, the multimodal diagnostic model developed during the study was substantiated as a scientific and methodological solution that allows for a comprehensive assessment of a teacher's professional activity based on multi-source data.

Based on the integration of systemic, competency-based, and activity-oriented approaches, an evaluation system was developed, including motivational-value, cognitive, activity-

technological, communicative, and reflexive criteria. These criteria made it possible to comprehensively analyze the professional development of a teacher not only through the final result but also through the dynamics of their development, digital competence, innovative activity, and reflective activity.

The results of the experimental work confirmed the practical effectiveness of the developed multimodal diagnostic model and the "MuhandislikWeb" information system. The automated collection, processing, and analysis of data on teacher activities through this platform has not only increased the objectivity and reliability of assessment but also provided the necessary analytical information for shaping the individual professional development trajectory of educators [6]. At the same time, the integration of data obtained from LMS platforms, electronic portfolios, video lesson analysis, and artificial intelligence tools has significantly increased the accuracy and reliability of assessment results.

The scientific novelty of the research is determined by the development of a multimodal diagnostic model for assessing the professional performance of teaching staff, the integration of assessment criteria and indicators with digital educational technologies, and the proposal of mechanisms for automated monitoring of teacher activity based on the "MuhandislikWeb" information system [6]. This approach creates a methodological framework that serves the continuous monitoring of teachers' professional development, the scientific substantiation of management decisions, and the improvement of educational quality.

Based on the research results, the following proposals are put forward:

1. It is advisable to gradually introduce multimodal diagnostic principles into the process of evaluating the professional activities of teaching staff in higher educational institutions.
2. It is recommended to establish the integrated use of an electronic portfolio, statistics from LMS platforms, video lesson analysis, and analytical tools based on artificial intelligence within the evaluation system.
3. The use of the capabilities of the "MuhandislikWeb" information system in monitoring the professional development of educators and forming individual development programs increases the transparency and effectiveness of assessment.
4. It is advisable to include special modules on educational analytics, the use of artificial intelligence technologies for pedagogical purposes, and multimodal assessment methodology in professional development programs for developing the digital competence of teaching staff.
5. In future scientific research, improving the mechanisms for predicting the professional development of educators by integrating the multimodal diagnostic model with adaptive educational technologies, Big Data analysis, and predictive analytics tools should be considered a promising scientific direction.

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MODERN METHODS FOR DEVELOPING STUDENTS' RESPONSIBLE DECISION-MAKING AND MORAL CHOICE SKILLS

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Abstract. *The ability to make responsible decisions and morally justified choices is an important component of students' personal and social development. Contemporary education is expected not only to transmit knowledge but also to prepare learners for situations in which they must evaluate alternatives, anticipate consequences, understand the perspectives of others, and accept responsibility for their choices. This article examines modern pedagogical methods for developing students' decision-making and moral choice skills. Particular attention is given to structured decision-making, moral dilemma discussions, social and emotional learning, Philosophy for Children, fiction-based ethics education, project-based learning, reflective dialogue, and classroom modelling.*

Keywords: *decision-making, moral choice, moral education, ethical dilemma, social and emotional learning, Philosophy for Children, critical thinking, reflection, student responsibility.*

INTRODUCTION

One of the important tasks of contemporary education is to prepare students for situations in which knowledge alone does not provide a ready answer. Everyday life frequently requires young people to choose between competing interests, recognize the possible consequences of their actions, distinguish immediate benefit from long-term value, and consider how their decisions may affect other people. A student may need to decide whether to remain silent when witnessing unfair treatment, how to respond to pressure from peers, whether to admit a mistake that may lead to punishment, how to use information found online responsibly, or what to do when personal interests conflict with the needs of a group. Such situations cannot be solved successfully by memorizing moral rules. They require moral sensitivity, emotional regulation, critical thinking, empathy, and the ability to justify a choice.

Current research provides increasing evidence that these abilities can be developed through purposeful education. A 2026 systematic review and meta-analysis covering 92 randomized controlled trials and 12,693 students found that educational interventions focused on ethical and moral development produced meaningful improvements in students' moral outcomes. Particularly important was the finding that interventions containing student discussion were more effective than approaches based mainly on one-way transmission of information [1]. This result has a direct methodological implication: if the aim is to teach students to make responsible moral choices, the classroom should create opportunities for them to think, compare positions, explain reasons, listen to disagreement, reconsider assumptions, and experience the intellectual responsibility of choosing.

MATERIALS AND METHODS

A useful starting point is to understand decision-making as a **structured process rather than an isolated final action**. Students often experience choice as a quick response: "I want this," "my friend said so," "everyone does it," or "I was angry." Modern approaches attempt to slow this process down and make its stages visible. Moore and Gregory propose decision-making itself as a pedagogy for social and emotional learning, arguing that a structured approach to choice activates self-awareness, self-management, social awareness, relationship skills, and responsible decision-making [2]. From an educational perspective, students can be taught to ask a sequence of questions: What is the actual problem? Who is affected? What matters in this situation? What alternatives are available? What may happen after each choice? Which option is most consistent with my values and responsibilities? Can I explain why I made this decision?

RESULTS AND DISCUSSION

Such a sequence is important because young people do not always fail to make a good decision because they lack moral values. Sometimes they simply fail to notice an alternative, predict a consequence, or separate a strong emotion from the decision itself. A student involved in a conflict may initially view the situation only through personal anger. If the teacher asks the learner to identify everyone affected, describe the situation from another person's perspective, and predict the consequences of three possible responses, the moral dimension becomes clearer. The teacher is not deciding for the student; rather, the teacher is providing a cognitive structure within which the learner can make a more deliberate choice. Repeated practice with this structure gradually turns responsible decision-making into a transferable skill.

This approach is closely connected with social and emotional learning (SEL). Moral choice does not take place outside emotion. Anger, embarrassment, fear, loyalty, jealousy, sympathy, and the desire to belong may all shape a student's judgement. Consequently, ethical instruction that addresses only abstract principles may fail when students enter emotionally difficult real-life situations. Zieher and colleagues emphasize that effective SEL requires students not simply to know social and emotional concepts but to practise them, elaborate them, apply them in different contexts, and encounter adult modelling of appropriate behaviour [3]. Their pedagogical framework distinguishes between knowing a principle, knowing how to act on it, and knowing when a particular social-emotional response is appropriate. This distinction is particularly valuable for moral education. A student may know that humiliating another person is wrong, yet still participate in ridicule when surrounded by peers. The educational task is therefore to bridge the distance between moral knowledge and moral action.

One practical method is to use short classroom situations in which emotional and moral elements are deliberately combined. For example, students may consider a case in which a close friend cheats during an examination and asks them to keep silent. The moral problem is not merely whether cheating is right or wrong. The student must deal with competing values: friendship, honesty, loyalty, fairness toward classmates, and responsibility toward school rules. The teacher can ask students to identify these values before proposing a solution. The class may then compare alternative decisions and examine both short-term and long-term consequences. Such an activity demonstrates that responsible decision-making often involves tension between values rather than a simple choice between obvious "good" and "bad."

A second highly effective method is the use of moral dilemmas. Moral dilemmas are educationally valuable because they prevent students from solving every problem through a memorized rule. A well-designed dilemma contains two or more defensible considerations and

requires the learner to justify which consideration should have greater weight in a particular context. Tang and Dai propose combining ethical dilemma stories with project-based learning in order to connect moral reasoning with higher-order thinking and practical problem solving [6]. Their model demonstrates an important direction in modern education: ethical reasoning can be integrated with subject learning rather than confined to a separate morality lesson.

For example, environmental topics in science may raise questions about economic development and ecological responsibility; digital technology lessons can address privacy, artificial intelligence, plagiarism, and responsible use of information; history can include discussion of individual responsibility under social pressure; literature provides opportunities to examine motives, consequences, guilt, justice, loyalty, and forgiveness. This interdisciplinary approach helps students understand that moral choice is not restricted to exceptional situations. It is embedded in ordinary social, academic, technological, and civic life.

However, the value of a moral dilemma depends greatly on how the discussion is organized. The aim should not be to make students guess which answer the teacher considers correct. If learners believe that only one approved response is acceptable, they may learn to reproduce expected moral language without developing moral judgement. A productive discussion asks students to provide reasons, examine evidence, respond to objections, and distinguish between personal preference and an ethically defensible argument. Teachers may ask: “Why do you think this choice is justified?”, “Who might disagree with you and why?”, “Would your answer change if one detail of the situation changed?”, or “What consequence have we not considered?” Such questions move students from opinion to reasoning.

Research on fiction-based ethics education supports this dialogical approach. Lilja and colleagues examined students’ group discussions around fictional ethical situations and identified several conditions supporting multidimensional ethical competence: students needed to remain focused on the ethical task, show genuine interest in one another’s contributions, understand the context of the issue, and explore the complexity of human behaviour rather than reducing individuals to simple moral categories [5]. Fiction is especially useful because it creates a safe distance between the student and the problem. A child can discuss a character’s dishonesty, fear, selfishness, or courage before being asked to examine similar tendencies in personal experience.

Literature therefore becomes an important method of moral learning when the teacher moves beyond questions such as “Who was good?” and “Who was bad?” Instead, students can investigate motives: Why did the character act in this way? What other decision was possible? Did the character understand the consequences? Was the intention good even if the outcome was harmful? Could two characters both have reasonable arguments? Such questions teach students to recognize moral complexity. They also develop empathy because learners must temporarily enter perspectives different from their own.

CONCLUSION

Developing students’ ability to make responsible decisions and moral choices is not an additional task that can be separated from general education. It is closely connected with the learner’s capacity to understand self and others, manage emotions, analyse information, anticipate consequences, communicate respectfully, and assume responsibility. Contemporary educational research indicates that these abilities can be strengthened through purposeful pedagogical intervention [1].

Among the most effective modern approaches are structured decision-making, SEL-based teaching, moral dilemma discussion, Philosophy for Children, fiction-based ethics education,

project-based ethical problem solving, modelling, and systematic reflection. These methods share an important feature: the student is treated as an active moral agent rather than a passive recipient of rules. Learners are required to identify problems, compare alternatives, listen to different perspectives, justify decisions, and reconsider conclusions when new information appears.

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IMPROVING THE METHODOLOGY OF TEACHING BIOCHEMISTRY THROUGH VIRTUAL LABORATORIES IN HIGHER EDUCATION INSTITUTIONS (THE CASE OF PHARMACY PROGRAMS): A LITERATURE REVIEW AND MULTICENTER EVALUATION

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Abstract. *This article examines the pedagogical and methodological foundations for using virtual laboratory technologies in teaching biochemistry at higher education institutions, with particular attention to pharmacy programs. Drawing on international and Uzbek research, it considers how virtual laboratory environments help students understand molecular processes, acquire practical skills, and work independently, and it describes methodological approaches for combining virtual laboratories with traditional teaching. On this basis, an integrated five-stage teaching model is proposed. The model was evaluated in experimental groups at three medical higher education institutions in Uzbekistan (Samarkand, Bukhara, and Urgench; n = 265) using five criteria: cognitive, practical-activity, analytical-diagnostic, information-technology, and reflective-motivational. Depending on the criterion, 37.4% to 39.6% of students reached the high level and 21.5% to 21.9% remained at the low level, with a similar distribution at all three sites. The findings indicate that virtual laboratory tools improve the quality of biochemistry teaching and support the development of professional competencies when they are used as a complement to wet-laboratory classes.*

Keywords: *biochemistry, virtual laboratory, pharmacy education, digital learning, simulation, educational technology, higher education.*

Introduction. Over the past several years, the introduction of digital technologies has come to be regarded as one of the main ways of improving the quality of higher education. The need for innovative educational technologies is especially pressing in the training of medical and pharmacy professionals. In these programs, biochemistry is a fundamental subject: it studies the molecular and cellular processes that take place in living organisms. Because it covers complex topics such as metabolism, enzymatic reactions, proteins, nucleic acids, and bioenergetics, mastering the subject requires solid theoretical knowledge and well-developed spatial reasoning.

Teaching practice shows that many topics in biochemistry are abstract, and traditional teaching methods do not always explain them fully. Students find it particularly difficult to grasp processes at the molecular level, enzyme-substrate interactions, DNA replication, and protein biosynthesis. In such cases their learning motivation tends to decline, and they have difficulty linking theoretical knowledge to practice [1].

Current pedagogical research proposes virtual laboratory technologies as one effective way of addressing these problems. By modeling a real laboratory in a computer environment, a virtual laboratory gives students a safe and interactive setting in which experiments can be repeated. This

helps students understand laboratory procedures more deeply and also develops their capacity for independent thinking and analysis.

The integration of virtual laboratories into teaching has been studied extensively in the international literature, and a number of authors have confirmed their effectiveness. Virtual environments make it possible to visualize complex biochemical processes, repeat experiments under safe conditions, and build individual learning paths. At the same time, these authors stress that virtual laboratories should not fully replace traditional laboratory classes; they are better regarded as a teaching tool that complements and enriches them.

In the Republic of Uzbekistan, large-scale reforms are under way to digitalize higher education, introduce e-learning platforms, and develop innovative teaching technologies. Against this background, the use of virtual laboratory technologies in teaching biochemistry has become a pressing scientific and practical issue. However, a comprehensive methodology for teaching biochemistry to pharmacy students on the basis of virtual laboratories has not yet received sufficient research attention.

The aim of this article is therefore to examine, on the basis of the scientific literature, the pedagogical and methodological foundations of using virtual laboratory technologies in teaching biochemistry to pharmacy students, to identify effective ways of integrating them into the educational process, and to present the results of evaluating the proposed approach at three medical higher education institutions.

The relevance of the study lies in the fact that virtual laboratory tools considerably expand the opportunities to deepen students' theoretical knowledge, develop their practical skills, and form their professional competencies. The approach also supports the development of the digital competencies required of a modern pharmacy specialist.

Literature review. Over the past several years, the use of virtual laboratory technologies in teaching biochemistry has become one of the priority areas of educational research. Biochemical processes take place at the molecular level and cannot be observed directly, which makes the subject difficult for students to master. For this reason, digital visualization and simulation technologies have gained importance in current teaching approaches [1].

Mayer's theory of multimedia learning holds that integrating visual and verbal information reduces cognitive load and improves learning efficiency [2]. In biochemistry, this theory provides a sound didactic basis for explaining enzymatic reactions and metabolic processes.

Johnstone's three-level model of chemistry education (macroscopic, submicroscopic, and symbolic) applies equally to biochemistry education [3]. Students' main difficulty is imagining processes at the submicroscopic level, and this is precisely the gap that virtual laboratories help to fill.

Taber's work on chemical concepts and the way learners form them shows that the links between different representations need to be studied [4].

De Jong and colleagues showed that virtual laboratories are an effective complement to physical laboratories in science education [5]. A virtual environment allows an experiment to be repeated many times under safe conditions.

Brinson's research found no significant difference in learning outcomes between virtual and traditional laboratories, while the virtual format offered greater flexibility [6].

Makransky and Petersen found that virtual and immersive technologies increase students' motivation and cognitive engagement [7].

A meta-analysis by Huang and colleagues confirmed that virtual laboratories substantially improve learning outcomes [8].

Sapriati and colleagues showed that virtual laboratories develop students' competence in self-regulated learning [9].

Lateef emphasizes the important role of simulation-based education in developing clinical reasoning [10-11].

Reports by UNESCO and the OECD identify the digital transformation of education as one of the main directions for modernizing higher education systems [12].

Studies conducted by the Royal Society of Chemistry (RSC) and the American Chemical Society (ACS) confirm that the wider use of digital tools in chemistry and biochemistry education improves learning outcomes [13-18].

Zimba and colleagues showed that virtual simulations are effective in developing clinical competencies in pharmacy education [19].

Table 1. Digital tools used in teaching biochemistry with virtual laboratories and their didactic potential

Tool category	Platforms and software (examples)	Use in biochemistry	Didactic potential
Virtual laboratories	Labster, PhET, PraxiLabs	Enzyme kinetics, metabolic processes, DNA replication	Safe experimentation, repetition, interactive learning
Molecular visualization	PyMOL, UCSF Chimera, Jmol/JSmol	Structure of proteins, enzymes, and other biomolecules	3D visualization, structural analysis
Simulation platforms	PhET Simulations	Reaction rate, diffusion, osmosis	Dynamic models, conceptual understanding
Learning management systems (LMS)	Moodle, Google Classroom	Theory modules, tests, independent work	Management of the learning process
Multimedia resources	Videos, animations, interactive lessons	Metabolic pathways (Krebs cycle, glycolysis)	Visual explanation, motivation

Studies on the introduction of digital learning in the higher education system of Uzbekistan confirm that LMS platforms and virtual laboratories improve the quality of students' independent learning [20].

Taken together, the reviewed sources show that virtual laboratories perform three main functions in biochemistry teaching: they visualize molecular processes, model experimental work, and develop competencies for independent learning.

Materials and methods. The effectiveness of the methodology for teaching biochemistry with virtual laboratories in medical higher education institutions was assessed on the basis of students' theoretical knowledge, practical laboratory skills, ability to analyze biochemical processes, proficiency with digital laboratory tools, and reflective readiness for self-assessment. Accordingly, the assessment used the following five criteria:

1. **Cognitive criterion:** the level of mastery of theoretical knowledge in biochemistry, metabolic processes, and biochemical concepts.
2. **Practical-activity criterion:** the ability to complete tasks in the virtual laboratory, understand the stages of an experiment, and keep a laboratory protocol.
3. **Analytical-diagnostic criterion:** the ability to analyze biochemical parameters, compare them with reference values, and relate them to a clinical situation.
4. **Information-technology criterion:** the level of proficiency in using the virtual laboratory platform, electronic resources, and digital simulations.
5. **Reflective-motivational criterion:** the student's commitment to independent learning, ability to evaluate their own work, and professional motivation.

Results were classified into high, medium, and low levels. The high level means that the student completes tasks independently, fully, and with scientific justification; the medium level means that tasks are completed partly independently or with guidance; the low level means that knowledge and practical skills are not yet sufficiently developed.

The evaluation was carried out in experimental groups at three institutions: Samarkand State Medical University (n = 90), Bukhara State Medical Institute (n = 88), and Urgench State Medical Institute (n = 87), 265 respondents in total. For each criterion, the number and percentage of respondents at each level are reported.

Results and discussion. The literature review shows that the use of virtual laboratory technologies in teaching biochemistry to pharmacy students is a pedagogical factor that substantially improves the quality of the educational process. The use of virtual laboratories is associated with better mastery of theoretical knowledge, faster acquisition of practical skills, and more effective independent learning [1-4].

First, virtual laboratories expand the possibilities for visualizing biochemical processes. In traditional teaching, complex metabolic processes such as formation of the enzyme-substrate complex, ATP synthesis, glycolysis, and the Krebs cycle can only be explained schematically. A virtual environment presents these processes as dynamic models and helps students build a mental picture at the submicroscopic level. In terms of Johnstone's model, this narrows the conceptual gap [5].

Second, virtual laboratories develop students' practical competencies. Work in a traditional laboratory is constrained by time, reagents, and safety requirements, whereas experiments in a virtual laboratory can be repeated as often as needed. This allows students to analyze their errors and develops their experimental reasoning [6].

Third, virtual laboratories develop students' self-regulated learning skills. With LMS platforms and simulation software, students can manage their own learning path, plan their assignments, and analyze their results. This plays an important part in shaping the clinical reasoning of a future pharmacist [7].

Fourth, virtual laboratories increase students' learning motivation. Interactivity, gamification elements, and visual effects heighten students' interest in classes, which is particularly important when complex biochemical processes are being studied [8].

Table 2. Comparison of biochemistry teaching based on traditional and virtual laboratories

Criterion	Traditional laboratory	Virtual laboratory
Understanding of processes	Mostly theoretical, limited visualization	3D and interactive visualization
Safety	Chemical hazards present	Fully safe environment
Repeatability of experiments	Limited	Unlimited repetition
Cost	High (reagents, equipment)	Low running costs (software licenses may apply)
Student engagement	Moderate	High interactivity
Independent learning	Limited	Strongly developed
Competence development	Practical skills predominate	Integration of theory and practice

On the basis of these findings, an integrated methodological model for teaching biochemistry to pharmacy students was developed. The model consists of the following stages:

1. Presentation of theoretical material using multimedia.
2. Virtual modeling of molecular processes.
3. Experimental work in the virtual laboratory.
4. Organization of independent learning through LMS platforms.
5. Automated testing and simulation-based assessment.

The advantage of this model is that it brings the three main components of the educational process (theory, practice, and independent learning) together in a single digital ecosystem.

The discussion shows that virtual laboratories cannot fully replace traditional laboratory teaching, but they enrich it considerably and make it more effective. Brinson's research supports this view and recommends a hybrid model (physical plus virtual laboratory) as the most effective approach [9].

Virtual simulations also have an important place in developing clinical competencies in pharmacy education. Students practice decision-making, analysis, and drawing conclusions in an environment close to real clinical situations, which matters for their future professional work [10].

Overall, the analysis indicates that teaching biochemistry with virtual laboratories helps raise students' level of knowledge, develop their practical competencies, and strengthen their independent learning.

Effectiveness indicators. At Samarkand State Medical University, 90 respondents took part in the experimental group. Their mastery of biochemistry taught with virtual laboratory tools was assessed against the five criteria (Table 3).

Table 3. Distribution of respondents by assessment criteria at Samarkand State Medical University (n = 90)

Assessment criterion	High, n (%)	Medium, n (%)	Low, n (%)	Total
Cognitive	35 (38.9)	36 (40.0)	19 (21.1)	90
Practical-activity	34 (37.8)	36 (40.0)	20 (22.2)	90

Assessment criterion	High, n (%)	Medium, n (%)	Low, n (%)	Total
Analytical-diagnostic	33 (36.7)	37 (41.1)	20 (22.2)	90
Information-technology	36 (40.0)	35 (38.9)	19 (21.1)	90
Reflective-motivational	34 (37.8)	36 (40.0)	20 (22.2)	90

As Table 3 shows, at Samarkand State Medical University the largest number of students at the high level was recorded for the information-technology criterion (36; 40.0%). This indicates that students' skills in using the virtual laboratory interface, electronic assignments, simulated experiments, and digital laboratory resources are relatively well developed.

For the cognitive criterion, 35 respondents reached the high level, which indicates adequate mastery of theoretical knowledge in biochemistry, metabolic processes, and biochemical concepts. For the analytical-diagnostic criterion, the high level was reached by 33 respondents, showing that the ability to relate laboratory parameters to clinical situations still needs to be developed further.

Overall, most respondents at Samarkand State Medical University were at the high and medium levels, which points to a positive effect of classes organized with virtual laboratory tools.

At Bukhara State Medical Institute, 88 respondents took part in the experimental group. The results by criterion are shown in Table 4.

Table 4. Distribution of respondents by assessment criteria at Bukhara State Medical Institute (n = 88)

Assessment criterion	High, n (%)	Medium, n (%)	Low, n (%)	Total
Cognitive	34 (38.6)	35 (39.8)	19 (21.6)	88
Practical-activity	33 (37.5)	36 (40.9)	19 (21.6)	88
Analytical-diagnostic	34 (38.6)	35 (39.8)	19 (21.6)	88
Information-technology	35 (39.8)	34 (38.6)	19 (21.6)	88
Reflective-motivational	33 (37.5)	36 (40.9)	19 (21.6)	88

At Bukhara State Medical Institute the results were distributed fairly evenly. For every criterion, between 33 and 35 respondents were at the high level, which suggests that the virtual laboratory methodology affected the different competencies to a similar extent.

For the information-technology criterion, 35 respondents reached the high level, showing that students are adequately skilled in using virtual laboratory platforms, completing simulation tasks, and analyzing electronic results. The proportion of students at the medium level was higher for the practical-activity and reflective-motivational criteria, which points to the need to further develop students' ability to carry out experiments independently and evaluate their own work.

The Bukhara results indicate that teaching biochemistry with virtual laboratory tools had a positive effect not only on students' theoretical knowledge but also on their analytical and technological preparedness.

At Urgench State Medical Institute, 87 respondents took part in the experimental group. The results by criterion are shown in Table 5.

Table 5. Distribution of respondents by assessment criteria at Urgench State Medical Institute (n = 87)

Assessment criterion	High, n (%)	Medium, n (%)	Low, n (%)	Total
Cognitive	33 (37.9)	35 (40.2)	19 (21.8)	87
Practical-activity	34 (39.1)	34 (39.1)	19 (21.8)	87
Analytical-diagnostic	32 (36.8)	36 (41.4)	19 (21.8)	87
Information-technology	34 (39.1)	34 (39.1)	19 (21.8)	87
Reflective-motivational	33 (37.9)	35 (40.2)	19 (21.8)	87

At Urgench State Medical Institute the results were likewise concentrated at the high and medium levels. For the practical-activity and information-technology criteria, 34 respondents each reached the high level, indicating that virtual laboratory classes had a direct positive effect on students' practical and digital work.

For the analytical-diagnostic criterion, the high level was reached by 32 respondents. This is slightly lower than for the other criteria and shows that students' ability to relate biochemical parameters to clinical situations and to draw diagnostic conclusions from laboratory results needs further improvement.

The proportion of respondents at the low level was the same for every criterion (19 students; 21.8%), so roughly one student in five still requires additional methodological support.

Across the three institutions (n = 265), the share of respondents at the high level ranged from 37.4% (analytical-diagnostic criterion, 99 students) to 39.6% (information-technology criterion, 105 students), and the share at the low level ranged from 21.5% to 21.9%. The distribution of levels was similar at all three sites. At Samarkand and Urgench the analytical-diagnostic criterion had the fewest students at the high level, which makes the link between laboratory data and clinical interpretation a priority for further methodological work.

Conclusion. The literature review and the discussion of results show that teaching biochemistry to pharmacy students with virtual laboratory technologies substantially improves the quality of the educational process. Virtual laboratories allow students to master complex biochemical processes in a visual and interactive form and help deepen their theoretical knowledge.

The analysis identified the following main pedagogical advantages of virtual laboratory environments: the formation of concepts at the submicroscopic level through modeling of biochemical processes; laboratory safety; the possibility of repeating experiments without limit; and the development of students' self-regulated learning competencies.

In addition, using virtual laboratories together with LMS platforms and multimedia technologies ensures continuity of the learning process and makes it possible to build individual learning paths. This is an important factor in developing the professional competencies of pharmacy students.

The evaluation at three medical higher education institutions (n = 265) showed that, for each of the five criteria, about 78% of students reached the high or medium level, with comparable results at all sites. This article reports the post-intervention distribution in the experimental groups;

comparison with control groups and baseline measurements is needed to quantify the effect attributable to the methodology itself.

At the same time, the analysis showed that virtual laboratories cannot fully replace traditional laboratory classes. The greatest pedagogical effect is achieved with a hybrid approach that combines virtual and physical laboratory work.

Overall, improving the methodology of teaching biochemistry with virtual laboratories is a relevant direction for digital education today. It serves to raise the quality of education, develop students' practical skills, and build their professional competencies.

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AN INTEGRATIVE THEORY–SIMULATION–CLINIC METHODOLOGY FOR DEVELOPING PRACTICAL SKILLS OF FUTURE PHYSICIANS: PEDAGOGICAL FOUNDATIONS AND MODEL OF APPLICATION

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Abstract. *In medical education, theoretical instruction, simulation-based and clinical placements are often delivered as distinct cpmponents of the curriculum. As a result, students may have difficulty applying knowledge acquired in one setting to practical tasks encountered in another. This article aims to develop a pedagogicallygrounded approach to integrating theoretical instruction, simulation exercises and clinical practice into a continuous learning process. Traumatology is used to illustrate the proposed approach and to identify feasible ways of assessing students` practical competence. The study employed a pedagogical design approach. Relevant international and Uzbek publications were reviewed to identify principles that could guide the integration of classroom teaching. Simulation-based learning and workplace experience. Drawing on established learning theories, the proposed methodology was structured and a set of assessmentinstruments was developed for its subsequent evaluation. The Theory–Simulation–Clinic (TSC) methodology connects the three components through a common clinical case, a shared checklist, a student logbook and regular reflection. A plan of assessment based on a written test, an objective structured clinical examination, direct observation of procedural skills in the ward and qualitative feedback was developed. Conclusion: the methodology offers a coherent and low-cost framework for planning the teaching of practical skills; its effectiveness should be tested in a controlled pedagogical experiment.*

Keywords: *integrative teaching; medical education; practical skills; simulation; clinical placement; transfer of learning; traumatology.*

1. Introduction

Ask a final-year medical student where they learned to immobilise a fractured forearm, and the answer is rarely straightforward. A lecture described the types of fracture, a practical class demonstrated a splint on a plastic model, and during the clinical rotation the student watched a resident apply a cast. Each of these experiences was valuable, yet they rarely referred to one another. The student had to assemble the pieces alone, usually at the moment when a real patient was waiting. This fragmentation is one of the quiet weaknesses of medical curricula, and it is the starting point of the present article.

The idea that medical education should connect basic knowledge with clinical experience is not new. More than a century ago the Flexner report laid the foundation for the modern university medical school, with sciences taught first and clinical work after them, and this two-stage arrangement shaped medical programmes for decades (Cooke et al., 2006). The Carnegie Foundation's later review of American medical schools still called for a closer integration of formal

knowledge and clinical experience, for stronger standardisation of learning outcomes together with more individualisation of the process, and for habits of inquiry and improvement (Irby et al., 2010). The same recommendations are relevant wherever medical teachers are asked to prepare graduates who can work safely from the first day.

Learning theory offers several reasons why integration matters. According to Vygotsky (1978), learning is most effective when the learner works within a zone of proximal development, supported by a more capable partner. Kolb (1984) described learning as a cycle in which experience, reflection, conceptualisation and experimentation follow one another. Sweller (1988) showed that the working memory of a novice is easily overloaded when complex tasks are presented without structure, which suggests that a beginner needs to meet a procedure first in a protected, simplified form before facing it in the noise of a hospital ward. These views point to the same practical conclusion: knowledge, rehearsal and real practice should be arranged in a purposeful sequence and be explicitly connected.

Simulation fits naturally into such a sequence. Reviews have shown that simulation-based education with deliberate practice produces better skill outcomes than traditional clinical education alone (McGaghie et al., 2011), and that its effect depends on features such as feedback, repetition and integration into the curriculum (Issenberg et al., 2005). Kneebone (2003) emphasised, in the context of surgical training, that simulation should reproduce the educational needs of the clinical setting and not just the appearance of equipment. Zigmont and colleagues (2011) argued that learning through simulation is most effective when scenarios are built on adult learning theories and linked to the learner's prior experience. A simulation laboratory is therefore useful to the extent that it is a part of a chain and not an island.

The clinical placement is the other end of the chain. Dornan and colleagues (2007) described workplace learning as the result of an interaction between the opportunities that the clinical setting offers and the learner's own engagement, a view in line with Billett's (2001) concept of workplace affordances. Students learn a great deal on the ward, but the amount depends on whether they are prepared, whether they are allowed to take part and whether somebody observes and comments on what they do. Without preparation, placements risk becoming a period of observation. Without a link to what was practised earlier, simulation risks being forgotten.

Uzbek scholars have approached related questions from the side of pedagogical science. Muslimov (2007), in his doctoral dissertation, developed the theoretical and methodological foundations of the professional formation of teachers of vocational education, and his work is regularly cited as a basis for the study of professional-pedagogical competence in the country. Iskandjanova (2022) analysed the mechanism of methodological improvement of the professional and pedagogical competence of future medical teachers, and in a later article (Iskandjanova, 2023) addressed the formation of the professional-pedagogical competence of the physician-teacher in the educational process. Rustamov and co-authors (2024) considered the creation of an innovative educational environment in medical universities, with attention to digital technologies, individualisation of learning and blended forms, and Rustamov (2023) discussed the use of multimedia tools to enhance students' knowledge and skills in such an environment. Abdullaeva (2024), writing about the development of students' research competencies, showed the value of modelling the process of competence formation as a form of inquiry.The reviewed Uzbek studies provide a relevant national context for examing professional-pedagogical competence and innovation in medical education. Nevertheless, the specific mechanisms through whichtheoretical

instruction, simulation and supervised clinical practice can be coordinatedaround an individual practical skill warrant further investigation.

Although integration is widely advocated, concrete and testable methods for achieving it in the teaching of practical skills are less common. The aim of this article is to substantiate an integrative Theory–Simulation–Clinic (TSC) methodology for the development of practical skills of future physicians, to describe its components and linking mechanisms, to illustrate its use with the example of traumatology and to propose instruments for evaluating its effectiveness.

2. Materials and Methods

2.1. Study design

The work was a pedagogical design study, a type of research in which an educational methodology is developed on the basis of theory and published evidence, described in operational terms and prepared for empirical testing. Following the idea of Abdullaeva (2024) that modelling is a distinct form of inquiry, the construction of the methodology was treated as a research stage in its own right. The study did not involve patients, and no personal data were collected.

2.2. Analysis of sources

Publications were analysed in four groups: works on integration of curricula and on the relationship between basic and clinical learning; works on simulation-based education; works on workplace learning and assessment in the clinical setting; and publications of Uzbek authors on professional-pedagogical competence, on the professional formation of teachers and on innovative educational environments in higher and medical education. International literature was searched in PubMed and Google Scholar, and national publications in the journals of Uzbek universities and in dissertation collections. Priority was given to systematic reviews, guides of professional bodies and theoretical monographs. The texts were read to identify the conditions under which integration of teaching components was reported to be effective and the barriers that were described.

2.3. Derivation of the methodology

The content of the methodology was developed by comparing the conditions found in the literature with the realities of a clinical department. Traumatology and orthopaedics was chosen as the teaching context because it contains procedural skills with clear steps, such as the primary survey of an injured patient, immobilisation of a limb, control of external bleeding and examination of a joint, and because students meet such patients during the clinical rotation. The selection of skills was guided by their importance for every graduate and by the possibility of assessing them with a checklist.

2.4. Development of assessment instruments

To make the methodology testable, an assessment plan was prepared that covers the three levels of Miller’s pyramid (Miller, 1990). Knowledge is to be measured with a written multiple-choice test. The ability to demonstrate a skill in a controlled setting is to be assessed with an objective structured clinical examination (OSCE) in the format described by Harden and colleagues (1975). Performance with real patients is to be assessed with direct observation of procedural skills (DOPS) by clinical supervisors, in accordance with the recommendations on workplace-based assessment (Norcini and Burch, 2007). To understand the experience of students and teachers, focus groups and a questionnaire for teachers are proposed.

2.5. Plan for empirical testing

The methodology is to be tested in a quasi-experimental study in which an experimental group studies according to the TSC methodology and a control group follows the conventional sequential programme, with the same duration and the same teaching staff qualifications. Groups

will be compared on the instruments above with the appropriate statistical methods and effect sizes. Ethical approval and informed consent will be obtained before the study. This stage is outside the scope of the present article.

3. Results

3.1. Structure of the methodology

The TSC methodology consists of three teaching components and a fourth, reflective, element that closes the cycle (Table 1). The components are not delivered as separate blocks, but are interwoven in short cycles, so that the same clinical content returns in the seminar, in the skills laboratory and on the ward within a short time. The reflective element makes the connection visible to the student and returns the experience of the ward to the next seminar.

Table 1. Structure of the integrative TSC methodology

Component	Content and form	Linking mechanism
Theory	Short interactive seminar built around a clinical case; pre-reading and a brief self-test	Case reused in the simulation scenario
Simulation	Deliberate practice on task trainers and a full scenario with a mannequin; structured debriefing	Same checklist as in the ward assessment
Clinic	Supervised participation in the care of real patients with a defined procedural task	Student logbook and feedback from the clinical teacher
Reflection	Regular meeting of the group with the teacher to discuss logbook entries	Findings returned to the next seminar

3.2. Linking mechanisms

Four mechanisms were defined to connect the components. The first is the clinical case. A patient with a closed fracture of the distal radius, for example, is discussed in the seminar, re-created as a scenario in the skills laboratory and then looked for in the real ward within the same period. The second is a common checklist: the same observable steps are used by the teacher in the simulation laboratory, by the clinical supervisor on the ward and by students for self-assessment. The third is a logbook, in which each student records the procedures performed or observed, a short reflection and the feedback received. The fourth is the regular group meeting that closes the cycle, in line with the experiential cycle of Kolb (1984).

Feedback is treated as a deliberate element. Following the recommendations of Hattie and Timperley (2007), comments are organised around three questions: where the student is going, how he or she is doing and what should be done next. Clinical supervisors need a short briefing on the checklists and on giving such feedback, and teachers of all components should agree on the learning outcomes in advance.

3.3. Pedagogical conditions

The analysis suggested that the methodology can work only if several conditions are met: coordination among the departments or teachers who deliver the components; a shared set of learning outcomes and checklists; readiness of clinical supervisors to observe and give structured

feedback; access to simple simulation equipment; and a mechanism, such as the logbook, that allows the student's progress to be traced from one setting to another. The importance of the teacher's professional-pedagogical competence in meeting these conditions is emphasised in the work of Iskandjanova (2022, 2023).

3.4. Example from traumatology

Table 2 shows how one skill, immobilisation of a limb fracture, can be taught within the methodology. The same table can be adapted to the other target skills.

Table 2. Example of a teaching cycle for immobilisation of a limb fracture

Component	Activity	Evidence of learning
Theory	Seminar on a case of a closed forearm fracture; types of splint, indications, complications	Self-test, discussion
Simulation	Splinting on a trainer with a checklist, then a scenario with an injured patient and a debriefing	Checklist, debriefing notes
Clinic	Participation in splinting of a real patient under supervision	Logbook entry, supervisor feedback
Reflection	Group discussion of differences between the laboratory and the ward	Reflective notes

3.5. Assessment plan

The assessment plan connects the three components with the three levels of assessment. A written test examines knowledge, the OSCE examines the demonstration of skills with standard stations, and DOPS examines performance with real patients. The same checklist steps are used in the OSCE and in DOPS, which makes it possible to compare performance in the two settings and to study the relationship between them. The qualitative part, consisting of focus groups and a teacher questionnaire, will provide information on how students and teachers experience the continuity of learning and on the organisational difficulties.

4. Discussion

This article proposed an integrative methodology for teaching practical skills and described how it can be applied and evaluated. It rests on established theories of learning and on evidence that integration of components, feedback and repetition are conditions of effective skills training. At this stage it remains a methodology: its effect on students has not yet been measured, and the statements below should be read as expectations grounded in the literature, not as findings of an experiment.

The main expectation concerns transfer of skills to the workplace. McGaghie and colleagues (2011) reported that skills learned in the simulation laboratory can transfer to patient care, but also emphasised that transfer is not automatic. One condition that may support it is that the laboratory and the ward speak the same language. When the same checklist and the same case are used in both places, students know what is expected of them, and supervisors can build on what has been practised. This is consistent with the observation of Dornan and colleagues (2007) that

workplace learning depends on the match between the learner's preparation and the opportunities of the clinical setting.

Cognitive load theory helps to interpret the staged sequence (Sweller, 1988). A student who meets a splinting technique for the first time on a patient in pain has to manage the procedure, the patient, the environment and the supervisor's expectations simultaneously. A student who has already studied the case, rehearsed the steps and received feedback in a protected setting arrives with part of the task automated and can give more attention to the patient. Miller's (1990) pyramid describes the step from 'shows how' to 'does' as the most difficult to take, and the methodology is an attempt to narrow this gap by making the two levels continuous.

The proposed methodology fits the views of Uzbek scholars on the professional formation of teachers and students. Muslimov (2007) examined the theoretical and methodological foundations of the professional formation of teachers, and the idea that professional skills are formed through a deliberately designed system, and not by accident, is close to the logic of the TSC. Iskandjanova (2022, 2023) stressed the professional-pedagogical competence of those who teach in medical education, which is directly relevant, because the success of integration depends on teachers who can coordinate with each other, use checklists, observe and give feedback. Rustamov and co-authors (2024) and Rustamov (2023) point to the possibilities of an innovative educational environment with digital and multimedia tools; in the TSC they may be used for video demonstrations before the seminar, electronic logbooks and online access to checklists. Finally, Abdullaeva (2024) suggested that the formation of competence should be modelled as a process, which corresponds to the cycle-based design of the methodology.

The role of feedback should not be underestimated. Hattie and Timperley (2007) concluded that feedback is among the most powerful influences on learning, but only when it is specific and tied to a goal. The logbook, the common checklist and the regular meeting offer several occasions for such feedback within every cycle, whereas in a conventional programme feedback on the ward often depends on the time and interest of the individual supervisor. Integration is therefore not mainly a matter of equipment but of coordination.

Integration has a cost, and it is paid mostly in the form of meetings, shared documents and agreement among departments that traditionally work apart. A coordinator for each rotation and a simple shared logbook will probably be needed. Clinical supervisors will also have to accept a new role: instead of being only practitioners who allow students to watch, they become observers who assess and give structured comments.

4.1. Limitations

The most important limitation is that the methodology has not yet been tested empirically, so its effectiveness is a hypothesis. It was developed from published sources, and although the search covered international and national literature, some relevant works may have been missed. The example relates to one clinical discipline, and adaptation to other specialties will require changes in tasks and checklists. The assessment instruments have not been validated for reliability in the local context. Finally, the methodology assumes a degree of readiness of teachers and clinical supervisors to cooperate, which is not equally present in all institutions.

4.2. Practical implications and directions for further research

For departments that would like to try the approach, we suggest beginning with a small number of target skills and building the shared checklist first, because it is the cheapest and most powerful link. A regular short meeting is enough to close the cycle. Clinical supervisors need a briefing and, ideally, recognition of the extra effort in their workload. For curriculum planners, the

proposal argues against the separate scheduling of theory, simulation and clinical blocks and in favour of a spiral arrangement in which the three components return to the same content several times with growing complexity. The next step is a controlled pedagogical experiment using the assessment plan described here, with later follow-up of students during internship.

5. Conclusion

The integrative Theory–Simulation–Clinic methodology, which connects the three components of teaching through a common clinical case, a shared checklist, a student logbook and regular reflection, offers a coherent, theoretically grounded and low-cost framework for developing practical skills of future physicians. It takes into account the works of national scholars on professional-pedagogical competence and innovative educational environments and can be adapted to different clinical disciplines. The assessment plan proposed in the article makes it possible to test the effectiveness of the methodology in a pedagogical experiment, which is the logical direction of further research.

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A STAGED MODEL FOR DEVELOPING RESEARCH SKILLS OF MEDICAL STUDENTS IN HIGHER EDUCATION INSTITUTIONS: PEDAGOGICAL FOUNDATIONS AND APPLICATION IN THE TEACHING OF ENDOCRINOLOGY

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Abstract. *Research competenceis an important element of medical training. However, opportunities to develop research skills may be limited to a short course or to students who independently seek research experience. Further methodological work is needed to clarify how research skills can be developed progressively throughout medical education. To substantiate and describe a staged model for the formation of research skills of medical students and to show how it can be applied in the teaching of endocrinology. A pedagogical design study was carried out. The study involved a review of international and Uzbek literature on research training and pedagogical competence in medical education. Learning theories informed the design of the model, and assessment instruments were prepared for itsfuture evaluation. The proposed model comprises four linked stages - orientation, guided critical appraisal, a small-scale research project and dissemination-underpinned by five pedagogical conditions: links with clinical content, mentoring, formative feedback, gradual increase of complexity and orientation to a real scientific product. An analytic rubric, a self-efficacy questionnaire and indicators of scientific output were prepared to evaluate the effect of the model. The model provides a framework for integrating research training into the existing of a clinical department. Its educational value remains to be established through a controlled pedagogical study.*

Keywords: *research skills; medical education; staged model; mentoring; endocrinology; pedagogical conditions; self-efficacy.*

1. Introduction

Physicians regularly encounter new scientific information, including updated diabetes guideleness, clinical trials of obesity treatments and research findings shared at professional meetings. Whether the doctor can decide what deserves trust depends on skills that are learned, not inherited. These skills include formulating a clear question, finding and reading the literature, judging the quality of evidence, handling data and communicating findings. These abilities are commonly discussed as components of research competence. Their development is therefore relevant both to curriculum design and to the preparation of future physicians.

Evidence from medical education suggests that research skills require deliberate teaching and opportunities for active student participation rather than relying on the medical curriculum alone. Systematic reviews of medical student research report that involvement in research is associated with later academic interest and with publications, but also that participation is uneven and often depends on the personal initiative of students and the availability of supervisors (Amgad et al., 2015; Chang and Ramnanan, 2015). Murdoch-Eaton and colleagues (2010) found that students understand ‘research’ in very different ways, from reading papers to running a laboratory experiment, and that curricula rarely make the intended skills explicit. The AMEE Guide by

Laidlaw and colleagues (2012) concluded that research training should be planned as a coherent longitudinal strand and not as an isolated block.

Pedagogical theory supports this view. Healey and Jenkins (2009) distinguished four ways of linking teaching with research: students can learn about research findings, learn to do research, take part in research discussions and do research themselves; a good programme uses all four. Brew (2006) argued that the separation of teaching and research is artificial and that students should be treated as members of an academic community. In terms of skill acquisition, the five-stage model of Dreyfus and Dreyfus (1980) suggests that a learner moves from a novice, who follows rules, towards a proficient performer who recognises patterns, which implies that tasks should be sequenced with increasing complexity. Bruner's idea of a spiral curriculum, developed for medicine by Harden and Stamper (1999), adds that topics should be revisited several times at greater depth.

Uzbek researchers have also addressed these questions. Abdullaeva (2024) analysed the pedagogical approaches used by university teachers to develop research skills and described the modelling of this process as a distinct form of inquiry in which the development itself becomes the object of study; among the skills she listed were posing questions, analysing information, formulating hypotheses, conducting experiments and interpreting results. In the field of medicine, Iskandjanova (2022) emphasised that improving the methodological preparation of medical educators requires attention to professional, pedagogical and informational competence, and reviewed the work of several Uzbek methodologists on the structure of pedagogical competence. The theoretical and methodological foundations of the professional formation of teachers of vocational education were examined in the doctoral dissertation of Muslimov (2007), which remains an important reference for Uzbek pedagogical science. Rustamov and co-authors (2024) from Andijan State Medical Institute considered the creation of an innovative educational environment in medical universities and proposed individualisation of education through digital technologies, flipped classroom and blended learning, and in a further paper the same author discussed the use of multimedia tools to enhance students' knowledge and skills in an innovative educational environment (Rustamov, 2023). The Uzbek studies reviewed provide a foundation for discussing competence development and innovation in higher medical education. Less clearlydefined, however, is how research activities can be organised as a sequence of tasks within a clinical discipline, with explicit stages and assessment criteria.

Endocrinology provides a useful setting for developing research skills because it combines clinical-decision-making with the interpretation of numerical data and published evidence. It is a field rich in quantitative data (glycaemic indices, hormone levels, anthropometric measures), it deals with chronic conditions that are common in the population, and it produces a constant flow of clinical trials and guidelines, which gives students authentic material for appraisal. At the same time, many students regard research as something remote from the bedside. The article aims to develop a theoreticalrationale for ataged model of research-skills development among medical students and to describe its implementation and assessment within endocrinology teaching.

2. Materials and Methods

The work was a pedagogical design study, a type of research in which an educational model is developed on the basis of theory and published evidence, described in operational terms and prepared for empirical testing. This approach is common in pedagogical science, where the construction of a model is a necessary step before an experiment, and it corresponds to the idea of

Abdullaeva (2024) that the modelling of the development of research competence is itself a form of inquiry. The study did not involve patients, and no personal data were collected.

We analysed publications in three groups: international works on research training of medical students and on the links between teaching and research; works on learning and skill acquisition that could provide theoretical grounds for a staged approach; and publications of Uzbek authors on research competence, professional-pedagogical competence and innovative educational environments in higher and medical education. International literature was searched in PubMed and Google Scholar, and national publications in the journals of Uzbek universities and in dissertation collections. Sources were selected for relevance to the formation of research skills, and priority was given to systematic reviews, guides of professional bodies and theoretical monographs. The texts were read to identify the skills named as components of research competence, the teaching methods recommended for their development and the conditions under which these methods were reported to work.

The content of the model was derived by comparing the skills and conditions found in the literature with the realities of a clinical department. Four design principles were adopted: gradual increase in complexity (Dreyfus and Dreyfus, 1980); repeated return to key skills at a higher level (Harden and Stamper, 1999); a combination of the four ways of linking teaching and research (Healey and Jenkins, 2009); and specific, goal-oriented feedback (Hattie and Timperley, 2007). Endocrinology was chosen as the context because its content is rich in quantitative data and in clinical evidence, and because students encounter chronic conditions in practical classes.

To make the model testable, three instruments were prepared. The first was an analytic rubric that defines levels of performance for each component of research skills. The second was a self-efficacy questionnaire constructed in accordance with the guidelines of Bandura (1997), in which students rate their confidence in carrying out specific research tasks. The third was a set of indicators of scientific output, such as the preparation of an abstract or a poster for a student conference. The content of the rubric was compared with the lists of skills in the literature to check that every skill was covered.

The model is intended to be tested in a quasi-experimental study with an experimental group that follows the model and a control group that follows the usual programme of endocrinology, with assessment before and after the course by the instruments described above. The comparison will be performed with standard methods for parametric or non-parametric data, with an effect size calculation. Ethical approval and informed consent will be obtained before the experiment, and student projects will use only published or anonymised data. This stage is outside the scope of the present article.

3. Results

3.1. Structure of the model

The analysis led to a model with four interconnected stages, each of which corresponds to a stage of growing independence of the student (Table 1). In the first stage the student is oriented in the language and tools of research. In the second, he or she learns to read scientific work critically with the guidance of a teacher. In the third, the student carries out a small project, and in the fourth presents the results to an audience. The stages can be realised within one semester of a clinical discipline, or extended across several years of study in the form of a spiral.

Table 1. Stages of the model and main learning activities

Stage	Learning activities	Teacher's role	Product
1. Orientation	Research question and PICO; searching PubMed and national sources; academic integrity and referencing	Demonstrates, explains	Search log, structured question
2. Guided appraisal	Reading of a trial on diabetes or thyroid disease with a checklist; journal club in small groups	Facilitates discussion	Appraisal sheet
3. Mini-project	Small audit or literature-based project on an endocrine topic; data table, simple statistics	Mentor, regular consultations	Project report
4. Dissemination	Structured abstract, poster or oral presentation, peer review within the group	Gives feedback, organises session	Abstract and presentation

3.2. Pedagogical conditions

Five pedagogical conditions were identified as necessary for the model to work. The first is a link with clinical content: each research task should arise from a topic that students are studying at the same time, for example a PICO question built on the case of a patient with type 2 diabetes seen in the practical class. The second is mentoring, which means that each student has a teacher who knows his or her project and meets regularly, supported by a small peer group. The third is formative feedback: rubrics are shared in advance, products are returned with comments and students have a chance to revise them. The fourth is a gradual increase of complexity, so that the student never faces a task for which he or she has not been prepared by an earlier stage. The fifth is orientation to a real scientific product, such as an abstract that can be submitted to a student conference, which gives the work a purpose beyond a grade.

3.3. Application in the teaching of endocrinology

Examples of tasks for each stage in endocrinology are shown in Table 2. They are not an exhaustive list, but they demonstrate that the content of the discipline offers a natural basis for every stage. The tasks can be changed in accordance with the topics of the course, for example thyroid disorders, obesity or adrenal pathology.

Table 2. Examples of endocrinology tasks for each stage

Stage	Example of task	Skill developed
Orientation	Formulate a PICO question about a treatment option for type 2 diabetes and document the search strategy	Question formulation, information search
Guided appraisal	Appraise a published trial on thyroid hormone therapy using a checklist and discuss it in a journal club	Critical appraisal
Mini-project	Review of anonymised outpatient records or published data on a defined endocrine topic; tabulate and describe findings	Data handling, interpretation

Stage	Example of task	Skill developed
Dissemination	Prepare a structured abstract and a poster, and give feedback on the work of a peer	Scientific communication

3.4. Assessment instruments

The analytic rubric contains five criteria that correspond to the components of research skills found in the literature: formulation of the question, search for information, critical appraisal, data handling and scientific communication. For each criterion three levels of performance are described (basic, intermediate and advanced), as shown in Table 3. The descriptors are formulated in terms of observable features of the student's work, so that different teachers can apply them in a similar way.

Table 3. Fragment of the analytic rubric

Criterion	Basic level	Intermediate level	Advanced level
Formulation of the question	General topic without a clear question	Question with some PICO elements	Clear, answerable PICO question
Search for information	Single source, no strategy	Several sources, partly documented	Documented strategy, relevant databases
Critical appraisal	Retells the content	Identifies design and main limits	Judges bias, sample and clinical importance
Data handling	Numbers listed without order	Correct tables and simple measures	Appropriate methods, no overstatement
Scientific communication	Unstructured, weak referencing	Structured, mostly correct	Concise, structured, academic integrity observed

The self-efficacy questionnaire contains items that describe typical research tasks, such as searching for an article in a database, evaluating a trial or presenting findings, and each is rated on a scale of confidence. The indicators of scientific output include the preparation of an abstract, a poster or a presentation for a student conference and participation in a journal club. Together the three instruments cover the cognitive, motivational and practical aspects of research competence.

4. Discussion

An important consideration in developing students` research competence is the level of independence expected at different stages of their education. In practice, students may demonstrate interest in scientific activities but lack the confidence or metodological knowledge required to participate in research independently. This suggests that research engagement should be introduced gradually and suppoted by appropriate teaching strategies. This article proposed and described a staged model of the development of research skills of medical students and demonstrated how it can be applied in endocrinology. The model is based on well-established theories of learning and on evidence that research training is most effective when it is planned as a continuous strand of the curriculum. It remains a model: its effect on students has not yet been measured, and the claims below should be read as expectations grounded in the literature and not as findings of an experiment. The proposed model addtesses this issue by creating a progression from teacher-guided activities to more independent forms of academic work rather than expecting

students to conduct research from the beginning, it allows them to become familiar with basic research procedures before undertaking more complex tasks. Such an approach may reduce the difficulties associated with students` initial encounters with scientific literature and research methodology.

Why might the model work? The main reason concerns structure. In the traditional course research often appears as a lecture and a final assignment, which gives students little opportunity to practise individual elements and receive comments. In the staged model each skill is isolated, practised and then combined with others in the mini-project, in line with the progression from rule-following to pattern recognition described by Dreyfus and Dreyfus (1980). The return to the same competencies at a higher level, for example searching in the first stage and again in the preparation of the project, reflects the spiral principle (Harden and Stamper, 1999). Laidlaw and colleagues (2012) similarly recommended that research training progress from simple to complex and be integrated into the programme.

The choice of clinical content is likely to be important as well. Murdoch-Eaton and colleagues (2010) pointed out that students often fail to see the relevance of research methods for their future work. When a PICO question grows from the patient with diabetes seen that morning, and when a trial on thyroid disease is read in the week the topic is taught, research stops being a separate subject and becomes a way of thinking about a clinical problem. This agrees with the view of Healey and Jenkins (2009) that research-based learning is most useful when students are active participants and not only recipients of results, and with Brew’s (2006) call to see students as part of the academic community.

The model also fits the observations of Uzbek scholars. The list of research skills given by Abdullaeva (2024), from asking questions to interpreting results, corresponds closely to the criteria of the rubric, and her proposal to treat the formation of research competence as a modelled process supports the idea of explicit stages. Iskandjanova (2022, 2023) drew attention to professional and pedagogical competence as a condition of the educational process in medicine, and her work on the physician-teacher is a reminder that the effectiveness of teaching depends on the competence of those who teach. This is directly relevant here: mentors need a clear understanding of the rubric and of how to give constructive comments, and the model would hardly work if they simply supervised the final product. The broader theoretical basis of professional formation of teachers described by Muslimov (2007) may help to define the content of such preparation. Finally, the individualisation and blended elements recommended by Rustamov and co-authors (2024), as well as the use of multimedia tools discussed by Rustamov (2023), can be incorporated into the model, for example in the form of an online search log, short video tutorials and the opportunity to revise products electronically.

The role of mentoring and feedback deserves emphasis. Hattie and Timperley (2007) showed that feedback is most helpful when it is specific, linked to goals and offers guidance for the next step. In the mini-project stage regular consultations are designed to provide exactly this kind of guidance. In many medical universities supervisors are overloaded, and a model that depends on individual mentoring may seem unrealistic. Peer review in the second and fourth stages is one possible way to reduce the burden on teachers and also to give students the experience of evaluating scientific work, which is itself a research skill.

Quantitative skills deserve special attention. A module of a few hours a week is enough to introduce descriptive statistics but not to master them, and collaboration with the departments of medical informatics or biostatistics will probably be needed. The relationship with evidence-based

medicine is also important: Straus and colleagues (2011) and Ilic and Maloney (2014) have shown that integrated, clinically oriented teaching of evidence-based practice is more effective than stand-alone lectures, and the staged model can be seen as a way to embed this principle in a clinical course.

The model also highlights the importance of the learning environment. Regular feedback, accessible academic supervision and opportunities to discuss research findingsmay encourage students to participate more activelyin scientific activities. However, the teacher`s support should not replace students` own intellectual efforts, Instead, it should help them d and skills necessary to make reasoned academic decisions.

The most important limitation is that the model has not been tested empirically in this article, so its effectiveness is a hypothesis. The model was developed on the basis of published sources, and although efforts were made to cover international and national literature, some relevant works may have been missed. The examples relate to one discipline, and adaptation to other specialties will require changes in the tasks. The rubric has not yet been validated for reliability and may need adjustment after use. Finally, the model assumes a certain level of readiness of teachers to act as mentors, which is not equally present in all departments.

For medical universities wishing to apply the model, we recommend beginning with one discipline and a small group of motivated mentors, linking each stage with a real product and giving the rubrics to students at the beginning. Time should be reserved for feedback, since without it the stages become a list of assignments. At the programme level, the stages might be distributed across the years of study, with orientation in the first years, guided appraisal and mini-projects in the clinical years and dissemination in the final year. The next step is a controlled pedagogical experiment with assessment by the instruments described here, followed by a longer observation of the participation of students in research and by the study of teachers' readiness for mentoring.

5. Conclusion

The development of research competence in medical students requires more than the introduction of separate research assignments into the curriculum. It should be supported by a consistent educational process in which students graduallyy acquire the knowledge and practical skills needed to engage with scientific evidence. The proposed four-stage model offers a stuctured wat to organise this process within endocrinology education, beginning with basic research awareness and progressing towards the presentation of students` own research findings. Particular attention is given to the connection between research activities and clinical topics, as this connection may help students recognise the importance ofrelevance of scientific inqquiry to their future professional practice. The model also underlines the importance of academic supervision and regular feedback, while encouraging students to take increasing responsibility for their learning.Altough the proposed framework provides pedagogical basis for integrating research activities into medical education, its effectiveness still needs to be examined through practical implementationand emperical evaluation. Future studies should therefore investigate changes in students` jresearch skills, confidence and ability to interpret clinical evidence over the course of the programme.

A staged pedagogical model that leads students from orientation in research methods, through guided appraisal and a small project, to the presentation of results, tied to the clinical content of endocrinology and supported by mentoring and formative feedback, offers a coherent framework for the development of research skills of medical students. The model rests on established learning theories, takes into account the works of national scholars and can be

introduced within the existing resources of a clinical department. The instruments proposed in the article make it possible to test its effectiveness in a pedagogical experiment, which is the logical direction of further research.

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GENRE-BASED PEDAGOGY FOR ARGUMENTATIVE WRITING IN PRE-SERVICE LANGUAGE TEACHER EDUCATION: THEORETICAL SOURCES AND DIDACTIC AFFORDANCES

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Abstract. *Policy documents governing higher education in Uzbekistan call for writing instruction that develops critical, analytical thinking and that is sequenced coherently across the stages of continuous education. The pedagogical theory capable of meeting both demands, however, has seldom been examined as a whole in the national literature on foreign-language teacher education. This integrative conceptual review traces the theoretical sources of genre-based pedagogy and assesses what they offer for teaching argumentative writing to pre-service teachers of English. Three genre traditions (the Sydney School of systemic functional linguistics, English for Specific Purposes, and the New Rhetoric) are compared by how they define genre, analyse texts, and frame instruction, and are then read alongside Tardy's model of genre knowledge, Vygotskian developmental theory, and post-Soviet foreign-language methodology. The analysis shows that the traditions answer complementary questions: how a text is built, for whom and for what purpose, and why it takes its conventional shape. Genre awareness, understood as a metacognitive capacity to analyse unfamiliar genres, emerges as the construct that binds them in teacher education. Five didactic principles are derived, and five argumentative genres (essay, discussion, problem–solution text, commentary, and review) are ordered by dialogic range and source dependence. The resulting framework offers a theoretically grounded basis for designing and assessing argumentative writing courses.*

Keywords: *genre-based pedagogy, argumentative writing, genre awareness, teaching–learning cycle, systemic functional linguistics, pre-service teacher education.*

Introduction

Writing occupies an awkward position in foreign-language teacher education. Pre-service teachers have to write well in English themselves, yet within a few years they will also have to explain to their own pupils why a persuasive text is organised the way it is and what makes one argument more convincing than another. A curriculum that treats writing as the accurate assembly of sentences prepares them poorly for the first task and hardly at all for the second. What such a curriculum lacks is a theory of text that makes the relation between language choices and social purpose visible, and therefore teachable (Hyland, 2007).

In Uzbekistan this need is written into policy. The Concept for the Development of the Higher Education System of the Republic of Uzbekistan until 2030 names, among the persistent weaknesses of the system, students' underdeveloped critical thinking and their limited capacity to locate and analyse information on their own (President of the Republic of Uzbekistan, 2019). Chapter 3, Section 1 of the Concept turns this diagnosis into tasks: enlarging the share of independent study, introducing methods and technologies that develop critical, creative, and

systemic thinking, and revising teacher-education curricula in light of international practice. Two years earlier, Resolution No. 610 of the Cabinet of Ministers of the Republic of Uzbekistan (2017, para. 1) had required that foreign-language attainment at every stage of continuous education be assessed through the four skills fixed in state educational standards (listening, reading, writing, and speaking) and that curricula be built on the principles of continuity and succession. Read together, the two documents make a double demand on writing instruction. It should cultivate a culture of reasoning, not linguistic accuracy alone, and it should be arranged as a staged, cumulative system in which each level prepares the next.

Genre-based pedagogy is a natural candidate for meeting this demand. It ties linguistic form to communicative purpose, and its classroom model rests on support that is withdrawn in measured steps. The difficulty is that genre-based pedagogy is not a single theory. It draws on at least three research traditions that define genre differently and disagree about the value of explicit instruction (Hyon, 1996). It also developed largely outside the methodological tradition that still frames foreign-language teacher education in Uzbekistan and other post-Soviet systems, where the works of Bim, Rogova, Passov, and Shchukin remain standard reading. Local applications of genre approaches have tended to adopt one model wholesale, leaving its assumptions, and its fit with established methodology, unexamined.

This article takes up that problem through a conceptual review guided by three research questions:

RQ1. How do the principal genre traditions conceptualise genre, and what does each contribute to the teaching of argumentative writing?

RQ2. Which theoretical constructs matter most when the learners are future teachers rather than simply future writers?

RQ3. Which didactic principles and which selection of argumentative genres follow from a synthesis of these sources, and how does that synthesis sit alongside post-Soviet foreign-language methodology?

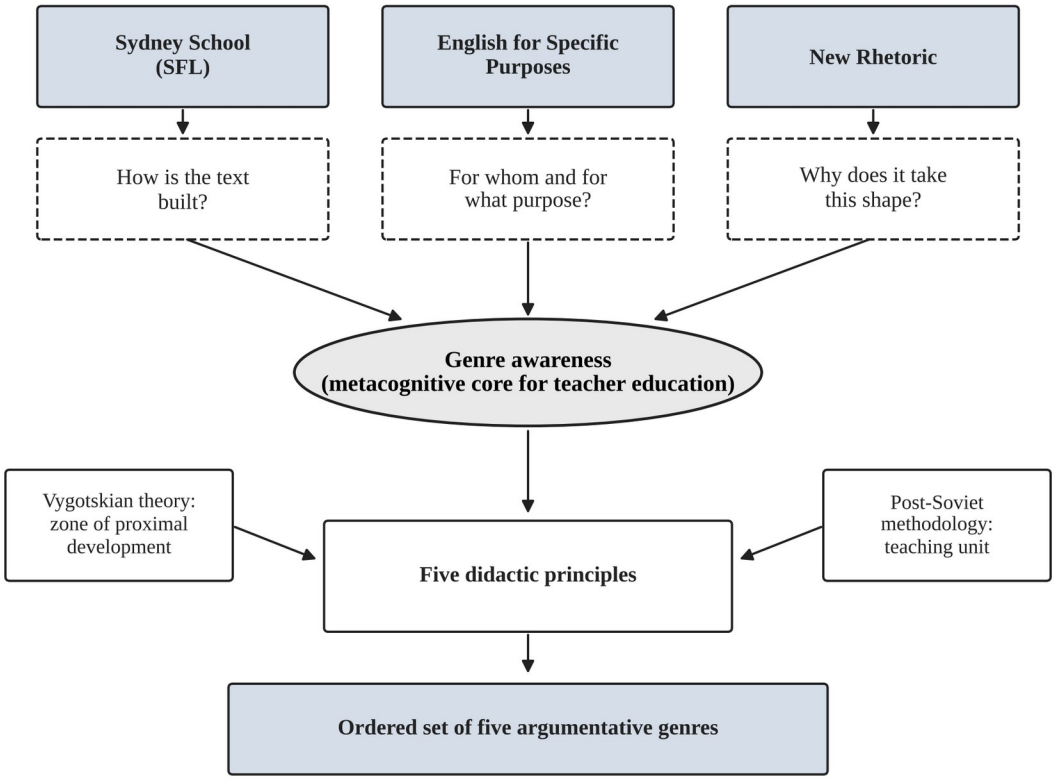
Method

The study follows the logic of an integrative conceptual review, in which existing theory is critiqued and recombined to produce a new framework rather than to estimate an effect (Torraco, 2005). Sources were selected purposively from three bodies of work: (a) foundational texts of the Sydney School, English for Specific Purposes (ESP), and New Rhetoric traditions; (b) studies of genre knowledge, genre awareness, and argument pedagogy in second-language writing; and (c) Russian-language methodology of foreign-language teaching that continues to anchor teacher-education syllabi in Uzbekistan. A text was retained if it offered a definition of genre or of a unit of instruction, proposed an instructional sequence, or addressed the assessment of writing.

Analysis proceeded in two passes. In the first, each source was read against four questions: how genre is defined, what unit of textual analysis is used, what stance is taken towards explicit teaching, and what follows for argumentative writing. In the second, the coded positions were compared across traditions to locate points of agreement and tension; the agreements were then reformulated as didactic principles and as criteria for selecting genres. Figure 1 sets out this analytic route. The review makes no claim to exhaustiveness, and its conclusions are offered as a theoretically argued framework that still awaits classroom validation.

Figure 1

Analytic Framework of the Review



Note. SFL = systemic functional linguistics. Dashed boxes give the guiding question that each tradition answers most fully. Arrows indicate the direction of the analysis, not causal relations.

Three Traditions of Genre Theory

Linguists have never fully agreed on what a genre is. Hyon (1996), in a widely cited survey, sorted genre scholarship into three traditions: the Australian systemic functional school, usually called the Sydney School; English for Specific Purposes; and the North American New Rhetoric. Comparing them by their definitions of genre, methods of text analysis, and pedagogical aims, Hyon concluded that they do not cancel one another out but illuminate different facets of the same phenomenon. Tardy (2009) later reframed the question from the writer's side, asking what a writer must know to command a genre, and distinguished formal, rhetorical, process, and subject-matter knowledge. Both accounts place one problem at the centre of genre teaching: how to balance form against situation and language against social action. For argumentative writing the balance is especially delicate, since an argument is at once a logical-linguistic structure and a move in a social exchange (Toulmin, 2003).

The Sydney School: Genre as a Staged, Goal-Oriented Social Process

The Sydney School rests on Halliday's systemic functional linguistics. Halliday (1978) treated language as a meaning potential and argued that every text is shaped by three variables of context (field, tenor, and mode), realised respectively through the experiential, interpersonal, and textual metafunctions (Halliday & Matthiessen, 2014). On this foundation, Martin and Rose (2008) defined genre as a staged, goal-oriented social process and mapped the genre families found in schools and wider society, among them the arguing genres of exposition, discussion, and

challenge. Within the Write It Right project, Rothery (1994, 1996) designed the teaching–learning cycle, which organises the passage from explicit teacher guidance to learner independence.

Research within the same school has traced how arguing develops over time. Christie and Derewianka (2008), analysing student writing across the years of schooling, showed that argument begins as the statement of a personal opinion and only later becomes multi-voiced discussion, marked by greater abstraction and wider use of grammatical metaphor. Derewianka (1990) set out for teachers the stages of argument and discussion texts and the language features typical of each. Feez (1998) adapted the cycle for adult education as a text-based syllabus that moves through building the context, modelling and deconstructing the text, joint construction, independent construction, and linking to related texts. The lesson running through these studies is that argumentative genres should be taught as a system of gradually increasing complexity. For teacher education, Derewianka's and Feez's contributions carry particular weight, because they show how the cycle becomes everyday classroom practice.

The strength of the Sydney School is that it makes the link between genre and language explicit: genre becomes observable at the level of linguistic resources and, by extension, teachable. Its weakness is the other side of the same coin. Genres tend to be presented as relatively stable, classifiable structures, and less attention is paid to how writers bend or resist them.

English for Specific Purposes: Moves, Purpose, and Discourse Community

The ESP tradition interprets genre through the notion of a discourse community. Swales (1990) defined a genre as a class of communicative events whose members share communicative purposes recognised by the expert members of that community, and he proposed analysing text structure as a sequence of rhetorical moves. Bhatia (1993) carried the model into professional settings, showing how move sequences relate to a community's strategic aims and how expert writers exploit generic conventions for their own intentions. Johns (1997), writing on academic literacies, treated genre as a unity of text, role, and context and argued that students should become researchers of genres rather than consumers of templates. Paltridge (2001) separated genre from text type and recommended that classroom genres be chosen according to the social situation and the learners' needs.

Across these four authors, explanatory weight falls on communicative purpose and community, and linguistic features are studied as the means by which moves are realised. Johns's figure of the student as genre researcher is the most useful of these ideas for teacher education. It cultivates the capacity to analyse an unfamiliar genre without a teacher present, which is precisely the capacity a future teacher will later need to pass on.

New Rhetoric: Genre as Social Action

The New Rhetoric treats genre as typified social action arising in response to recurrent situations (Miller, 1984). As Hyon (1996) observed, scholars in this tradition examine in depth the sociocultural context of genres and the values and relationships they encode, yet remain wary of explicit linguistic instruction. Tardy (2009), drawing on longitudinal case studies of multilingual graduate writers, showed that genre knowledge accumulates slowly through participation in real disciplinary activity and not only in classrooms, and argued on that basis for linking classroom tasks to authentic communicative situations. The New Rhetoric therefore points less towards teaching genre than towards understanding it.

Placed side by side, the three traditions answer different questions. The Sydney School explains how a text is written; ESP asks for whom and for what purpose; the New Rhetoric asks

why the text takes the shape it does. In preparing teachers of argumentative writing, none of these questions can be dropped. Table 1 summarises the comparison.

Table 1

Comparison of Three Genre Traditions and Their Relevance to Argumentative Writing

Dimension	Sydney School	English for Specific Purposes	New Rhetoric
Theoretical base	Systemic functional linguistics	Applied discourse analysis	Rhetorical and sociological theory
Definition of genre	Staged, goal-oriented social process	Class of communicative events with shared purposes	Typified action in recurrent situations
Unit of analysis	Stages and their lexicogrammatical realisation	Rhetorical moves and steps	Situation, values, and social relations
Stance on explicit teaching	Strongly explicit	Explicit, purpose-led	Cautious; favours participation and reflection
Guiding question	How is the text built?	For whom and for what purpose?	Why does it take this shape?
Contribution to argumentative writing	Stages of exposition and discussion; grammatical metaphor	Move analysis; genre research tasks	Awareness of audience, stance, and context
Main limitation	Risk of static templates	Focus on expert communities	Limited classroom guidance

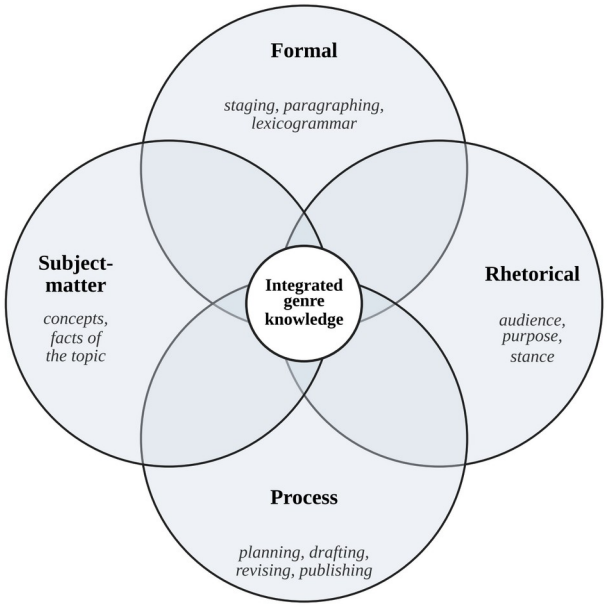
Note. Synthesised from Hyon (1996), Martin and Rose (2008), Swales (1990), Johns (1997), Miller (1984), and Tardy (2009).

Genre Knowledge and Genre Awareness

Tardy's (2009) four domains of genre knowledge become concrete when mapped onto the argumentative essay (Figure 2). Formal knowledge covers the staged structure of the essay, paragraph organisation, and the lexicogrammatical resources that realise each stage. Rhetorical knowledge concerns the writer's grasp of audience and purpose and of how to signal a position. Process knowledge refers to the practices of planning, drafting, revising, and preparing a text for its readers. Subject-matter knowledge is familiarity with the concepts and facts of the topic under debate. Tardy found that these domains gradually merge, producing in experienced writers a feel for the genre from the inside.

Figure 2

Four Domains of Genre Knowledge Applied to the Argumentative Essay



Note. Adapted from Tardy (2009). Overlapping areas indicate that the domains develop interdependently rather than in sequence.

For teacher education, however, the decisive concept is genre awareness. Johns (2008) describes it as the ability of writers who meet an unfamiliar genre to work out for themselves its purpose, audience, and structure, and she ranks this ability above the mastery of any single genre as a curricular goal. Tardy (2009) adds that genre knowledge does not migrate from one genre to another of its own accord; transfer depends on the writer's conscious recognition of similarities and differences between genres. Hyland (2004, 2007) links genre awareness to the second-language writer's capacity to take a critical stance towards the norms of the target community instead of simply reproducing them. Taken together, these positions show genre awareness to be wider than skill in any given genre. It is knowledge at the metacognitive level.

The concept matters for pre-service teachers in two ways. They must learn to write in several argumentative genres themselves, and they will later have to teach their own pupils to analyse genres. Genre awareness is therefore treated here as the construct that gives argumentative writing skills their professional orientation. It is what separates a teacher who writes well from a teacher who can make good writing learnable.

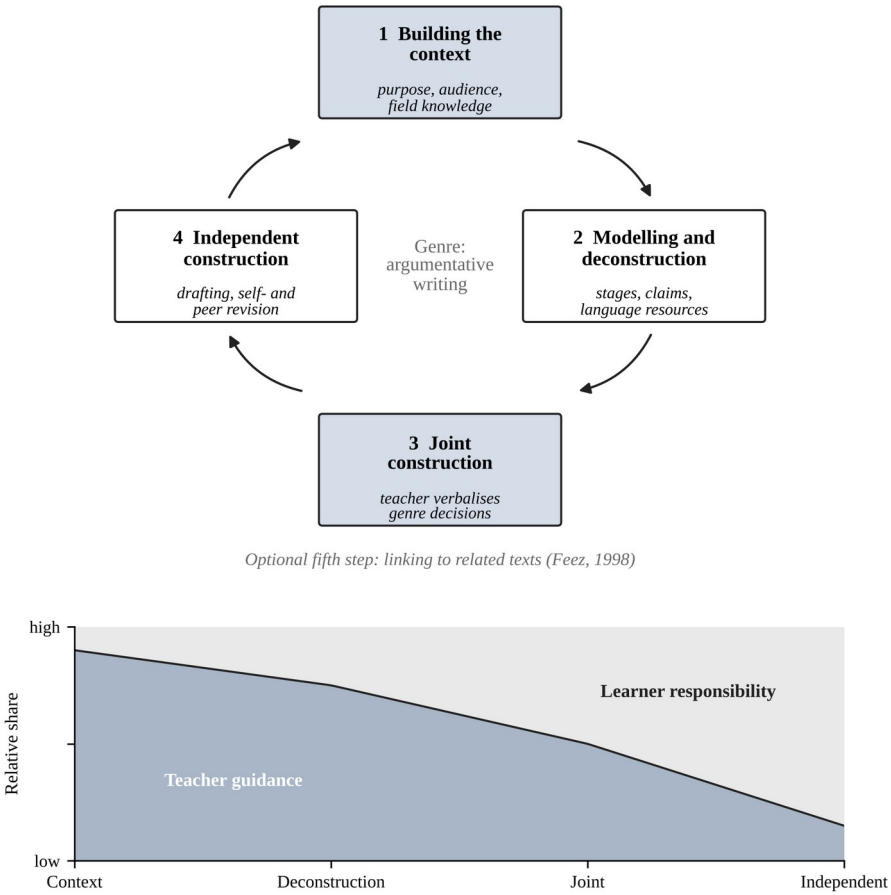
The Teaching–Learning Cycle and Its Developmental Rationale

The genre-based teaching cycle takes its theoretical warrant from Vygotsky's (1978) zone of proximal development: what learners can do today with the help of a more capable other, they will be able to do alone tomorrow. Rothery (1994), Feez (1998), and Rose and Martin (2012) turned this idea into a cycle with four core stages (Figure 3). *Building the context* establishes the field knowledge the topic requires, together with the social purpose of the genre and its audience. *Modelling and deconstruction* has the teacher and class jointly uncover, in a model text, the stages of the genre, the elements of the argument, and the language that realises them. In *joint*

construction, teacher and learners compose a new text together while the teacher thinks aloud about structural decisions. *Independent construction* asks learners to produce, and then revise, a text that meets the genre's requirements on their own.

Figure 3

The Genre-Based Teaching–Learning Cycle and the Handover of Responsibility



Note. Upper panel adapted from Rothery (1994), Feez (1998), and Rose and Martin (2012). The lower panel is a schematic representation of the handover principle; its values are illustrative, not measured.

Rose and Martin (2012) later embedded the cycle in the Reading to Learn program, which joins reading to writing. The extension suits argumentative writing, since most academic and professional argument is built from, and against, sources. The didactic core of the cycle is the gradual handover of control: teacher guidance contracts stage by stage as learner responsibility grows.

Convergence With Post-Soviet Foreign-Language Methodology

A recurring objection to genre pedagogy in post-Soviet teacher education is that it imports a foreign framework into a mature methodological tradition. A closer reading suggests otherwise. On the question of the unit of instruction, Bim (1977) argued that choosing the right teaching unit is the most important condition for developing foreign-language speech activity. Shchukin (2007) systematised contemporary approaches to language teaching, including the communicative-activity and competence-based approaches, and clarified how they relate to one another. Minyar-

Beloruchev (1985) maintained that writing, taught as a communicative skill, must take account of the types of written text and their communicative function. Rogova (1978), classifying methods and techniques, showed that the appropriateness of a method is determined by the unit of instruction.

If genre is adopted as the unit of instruction, it follows from these premises that methods and materials must be subordinated to the purpose of the genre. Genre-based pedagogy then appears less as a break with post-Soviet methodology than as one of its logical continuations (Table 2).

Table 2

Points of Convergence Between Post-Soviet Methodology and Genre-Based Pedagogy

Source	Methodological premise	Genre-based counterpart
Bim (1977)	The right choice of teaching unit conditions the development of speech activity	Genre as the unit of writing instruction
Rogova (1978)	The appropriateness of a method is set by the teaching unit	Methods subordinated to the social purpose of the genre
Minyar-Beloruchev (1985)	Writing is taught as communication; text types and their functions must be considered	Text stages and language features tied to communicative purpose
Passov (1991)	Instruction rests on the speech situation	Genre as the stabilised form of a recurrent written situation
Solovova (2002)	Self-monitoring and peer editing in the teaching of written speech	Self- and peer assessment against genre criteria
Shchukin (2007)	Outcomes defined as the ability to act in situations, not as stored knowledge	Genre models the social context in which texts are produced

Note. Russian-language sources are cited in transliteration; English glosses of their titles are given in the reference list.

From Approaches to Didactic Principles

The analysis also clarifies how genre-based pedagogy relates to three neighbouring approaches. From the competence perspective, Shchukin (2007) defines the outcome of instruction as the capacity to apply knowledge in a situation rather than as an accumulation of knowledge; genre models exactly that situation, namely the social context in which a text is produced. The communicative approach, as formulated by Passov (1991), requires that instruction be grounded in a speech situation, and genre is the stable written form that such situations acquire. The process approach, as Badger and White (2000) demonstrated in their process–genre synthesis, supplies the planning and revising strategies that writers need within a genre. Combining the three with genre-based pedagogy yields five didactic principles: explicit presentation of genre requirements, graduated withdrawal of teacher support, recursiveness of the writing process, integration of reading and writing, and transfer of the studied genre to professional situations (Table 3). How

these principles are sequenced and resourced within a complete instructional model lies outside the scope of this article.

Table 3

Didactic Principles Derived From the Synthesis

Principle	Operational meaning	Theoretical source	Policy requirement addressed
1. Explicitness	Stages, moves, and language of the genre are made visible and discussed	Martin & Rose (2008); Hyland (2007)	Development of critical and analytical thinking
2. Graduated support	Teacher guidance is withdrawn as learner control increases	Vygotsky (1978); Rothery (1994)	Staged, cumulative organisation of instruction
3. Recursiveness	Planning, drafting, and revising recur within each genre	Badger & White (2000)	Larger share of independent study
4. Reading–writing integration	Arguments are built from and against sources	Rose & Martin (2012)	Independent search for and analysis of information
5. Professional transfer	Genres are linked to the future teacher's classroom tasks	Johns (2008); Tardy (2009)	Revision of teacher-education curricula

Note. Policy requirements paraphrase the Concept approved by Decree No. PF-5847 (President of the Republic of Uzbekistan, 2019) and Resolution No. 610 (Cabinet of Ministers of the Republic of Uzbekistan, 2017).

Assessment as Part of Learning

Genre-based pedagogy also redefines the place of assessment. Hyland (2004) notes that a genre description fixes both the goal of instruction and the expected outcome, so that teaching and assessment come into alignment without further effort. Paltridge (2001) stresses that open discussion of genre structure with learners makes it easier for them to look critically at their own texts. Wingate (2012), working with undergraduates, shows that teaching students to examine their own writing in terms of argument is a precondition for their becoming independent writers. Solovova (2002) likewise gives self-monitoring and peer editing a prominent role in teaching written speech. On this view, assessment is not a final act detached from instruction but an internal part of learning. For future teachers the point carries double weight: through genre awareness they learn to analyse their own texts now and their pupils' texts later. Specific criteria and indicators for assessing argumentative writing belong to the outcome component of an instructional model and are reserved for subsequent work.

Selecting Argumentative Genres for Teacher Education

The preceding analysis supplies three criteria for selecting the genres that a teacher-education course should cover: membership in the family of arguing genres (Martin & Rose,

2008), practical currency in academic and professional communities (Bhatia, 1993; Swales, 1990), and a direct link with the written genres the future teacher will teach. Applying these criteria yields the five genres compared in Table 4. The description of language resources draws on Hyland's (2005) account of metadiscourse, and the internal structure of the argumentative essay follows Toulmin's (2003) distinction among claim, data, and warrant.

Table 4

Comparative Profile of the Selected Argumentative Genres

Genre	Social purpose	Typical stages	Key language resources	Professional relevance
Argumentative essay	To defend one position and persuade the reader	Thesis; arguments (claim, data, warrant); counter-argument and rebuttal; conclusion	Modal verbs, causal connectives, hedges and boosters	Basis for analysing and teaching pupils' essays
Discussion	To weigh an issue from several perspectives	Statement of the issue; arguments for; arguments against; evaluative conclusion	Comparison and contrast resources, citation and reporting verbs	Balanced treatment of contested educational issues
Problem–solution text	To establish a problem and propose a workable solution	Situation; problem; solution(s); evaluation of the solution	Cause–effect, conditional, and recommendation expressions	Reasoned proposals on educational problems
Commentary	To interpret and evaluate an idea from a source	Presentation of source and idea; interpretation; evaluation; conclusion	Paraphrase, reporting verbs, evaluative lexis	Teaching critical reading; written mediation
Review	To evaluate a work or teaching material on stated grounds	Context; description; strengths and weaknesses; recommendation	Evaluative adjectives, hedges and intensifiers	Expert evaluation of textbooks and teaching materials

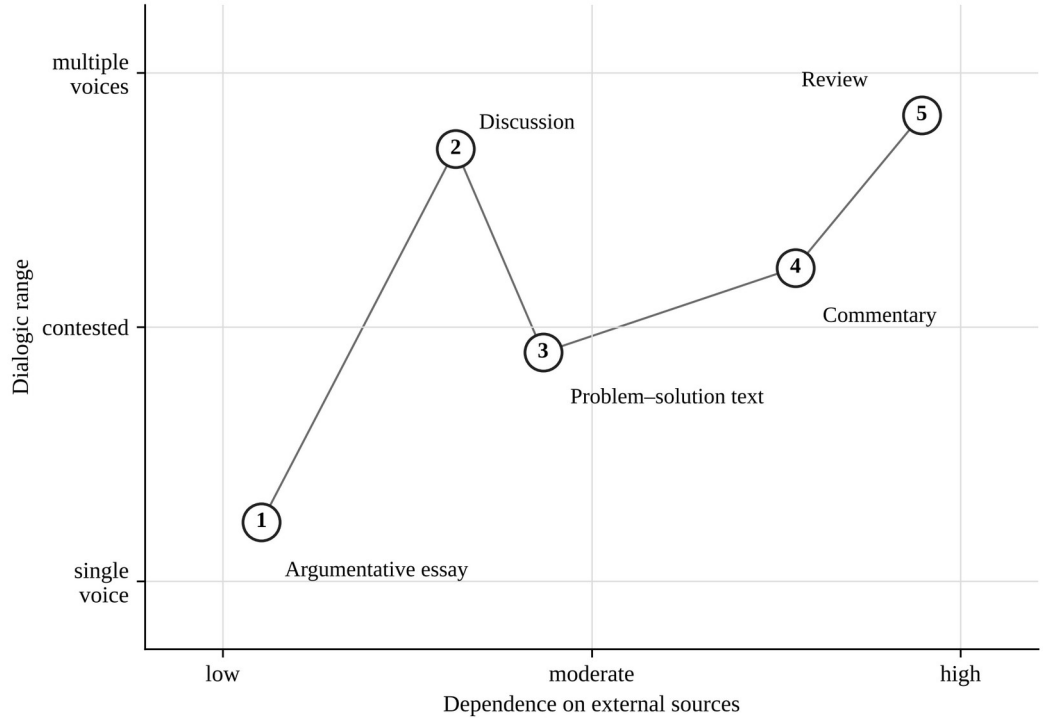
Note. Stages follow Martin and Rose (2008) and Derewianka (1990); language resources draw on Hyland (2005). Written mediation is used in the sense of the Council of Europe (2020).

All five genres belong to one family, yet their social purposes and argumentative strategies differ. In the essay the writer chooses a single position and defends it consistently; in the discussion several viewpoints are weighed before an evaluative conclusion is reached. The problem–solution text directs argument towards a practical proposal, the commentary towards the evaluation of an idea taken from a source, and the review towards the evaluation of an entire work or teaching

resource against stated criteria. The genres also line up by complexity, moving from a personal position to multi-voiced reasoning and then to critical evaluation grounded in sources. Figure 4 locates them on two dimensions drawn from the analysis, dialogic range and dependence on external sources, and the numbered path indicates a teachable order. The final column of Table 4 states what each genre offers the future teacher professionally, and it is this relevance that justifies its place in the set.

Figure 4

Conceptual Positioning of the Five Genres by Dialogic Range and Source Dependence



Note. Positions are interpretive judgements derived from the theoretical analysis (Christie & Derewianka, 2008; Martin & Rose, 2008); they are not measured values. Numbers indicate the proposed instructional sequence.

Discussion

The review makes three contributions. First, it recasts the three genre traditions not as rival schools but as answers to complementary questions, and it argues that a teacher-education course in argumentative writing needs all three answers. Second, it identifies genre awareness, rather than mastery of particular genres, as the construct that distinguishes the preparation of writing teachers from the preparation of writers. Third, it shows that genre-based pedagogy can be anchored in the post-Soviet methodological tradition through the shared concept of the teaching unit. This removes a recurrent objection to its adoption in Uzbek universities and gives national policy requirements a concrete pedagogical form.

The synthesis does not dissolve every tension. The Sydney School's commitment to explicit modelling sits uneasily with the New Rhetoric's warning that explicit teaching can harden genres into templates. The framework proposed here handles this tension procedurally. Deconstruction of model texts is paired with genre-research tasks of the kind Johns (1997, 2008) recommends, and the cycle closes by linking the studied genre to related texts (Feez, 1998), so that

learners compare variants instead of memorising a single form. A second tension concerns transfer. Including commentary and review connects argumentative writing with written mediation as described in the CEFR Companion Volume (Council of Europe, 2020), but whether skills developed in these genres carry over into the teaching of pupils' writing remains an empirical question.

The limitations of the study should be stated plainly. It is conceptual, it reports no classroom data, and its source selection was purposive rather than systematic. It does not address rhetorical conventions in Uzbek or Russian academic writing, which may shape how learners approach argument in English. The positions in Figure 4 are interpretive judgements. Each limitation marks a line for further research: an intervention study testing the cycle with pre-service teachers, stage-and-move analysis of their texts before and after instruction, and contrastive work on argumentative conventions across the languages of Uzbek higher education.

Conclusion

The policy documents that govern higher education in Uzbekistan ask writing instruction to develop reasoning and to proceed as a staged, continuous system. Genre-based pedagogy meets both requirements, provided that its three source traditions are read as complementary and that its aim in teacher education is set at genre awareness rather than at the reproduction of models. The five principles and the ordered set of argumentative genres proposed here translate that theoretical position into a form that course designers can use and that empirical studies can test.

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DIDACTIC POTENTIAL OF INNOVATIVE METHODS IN DEVELOPING DIGITAL THINKING IN STUDENTS: THEORETICAL DESCRIPTION

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Abstract. *The article provides a theoretical description of the didactic potential and expected effectiveness of selected innovative methods for developing digital thinking in students. The methods analyzed are blended learning, flipped classroom, gamification, microlearning, social learning, self-directed learning, project-based learning, and the SCAMPER, WIH, "Systems Operator" and "Focal Objects" techniques. For each method, its essence, implementation procedure, and relation to four criteria of digital thinking (motivational-value, cognitive, creative, and reflective) are shown. The asynchronous, synchronous, and contact-session formats of blended learning are substantiated as a structure that integrates the methods. An assessment framework consisting of the four criteria and three levels (reproductive, productive, and creative) is proposed for evaluating the effectiveness of the methods in future studies. Constraints such as teachers' digital competence, cognitive load, technical barriers, and digital inequality are also discussed. The article stresses that the effects of the methods were not measured with empirical data, so the conclusions are theoretical, and it outlines directions for further experimental research.*

Keywords: *Digital Thinking, Innovative Methods, Blended Learning, Creative Thinking, Assessment Criteria*

Login

The digitalization of education requires future professionals, in addition to using digital tools, to critically analyze information, solve problems algorithmically, find creative solutions, and reflect on their own activities. In Uzbekistan, the digitalization of the higher education process, the widespread introduction of digital educational technologies, and the expansion of project-based learning methods have been identified as priority tasks (President of the Republic of Uzbekistan, 2019, 2022).

The concepts of digital thinking, digital literacy, and digital competence are often used interchangeably or interchangeably in research (Spante et al., 2018). While many innovative methods are used in practice, it is often unclear which of them serves to develop which component of digital thinking and in what sequence they are combined in the learning process.

The purpose of this article is to theoretically describe the didactic potential and expected effectiveness of selected innovative methods for developing digital thinking in students. Research questions: (1) which criterion of digital thinking are the selected methods aimed at developing? (2) in what order are they used in the educational process? (3) how can their effectiveness be evaluated in the future?

Literature review

The theoretical basis of the concept of digital thinking was put forward by Wing (2006) as computational thinking: the author described it as a basic skill necessary for everyone, not just programmers. The pedagogical roots of this idea go back to Papert's (1980) constructivism: according to which knowledge is effectively formed in the process of creating a product by the learner. This view forms the rationale for project-based and creative methods.

Digital literacy was defined by Eshet-Alkalai (2004) as a set of skills needed in the digital age; in Europe, the DigComp framework was developed to describe digital competence (Ferrari, 2013). Pettersson (2018) reviewed the literature on digital competence in the context of education, Krumsvik (2008) analyzed teachers' digital competence as a competence that is formed in practical situations, and Martzoukou et al. (2020) studied self-assessed digital competences of higher education students. In Uzbekistan, Zakirova and Hamrayeva (2021) examined the development of digital competence of vocational education students through a multimedia project.

In the field of blended and online learning, Akyol and Garrison (2011) demonstrated that deep learning can be assessed through cognitive engagement, while Richardson et al. (2017) meta-analysis showed that social engagement in online environments is associated with student satisfaction and learning. These studies can serve as a basis for justifying blended and social learning methods. However, a systematic description of the selected set of methods according to the four criteria of digital thinking is lacking in the literature.

Method

The research is of a theoretical-analytical nature. The essence of each method, its application procedure, and its connection with the criteria of numerical thinking were analyzed; the results were summarized using comparative and systematization methods.

Digital thinking was characterized by four criteria: motivational-value (attitude to digital technologies as a value and internal motivation), cognitive (mastery of digital concepts, information analysis, algorithmic thinking), creative (creation of new pedagogical products using digital tools) and reflexive (analysis and planning of one's own activities). Three levels were distinguished for each criterion: reproductive, productive and creative. This framework is proposed for assessing the effectiveness of methods in further experimental research.

Results

Blended learning — a unitary structure

The selected methods are combined in a blended learning structure. In asynchronous mode, students independently master digital resources and complete current control tasks; in synchronous mode, interactive classes are held using online communication tools; and in contact sessions, orientation and coordination classes are organized in the classroom. The credit-module system allows the student to choose modules and form an individual educational trajectory, which is consistent with self-directed learning. In theory, such a structure connects theory with practice and allows the student to control the process of self-learning.

Methods that increase motivation and activity

Gamification introduces elements of points, levels, rewards, ratings, and competitions into the learning process. In practice, tests and assignments are conducted in the form of games on platforms such as Kahoot or Quizizz, and competitions can be organized between groups. This method is expected to support, first of all, the motivational-value criterion

In self-directed learning, the student creates a self-study plan, sets goals, implements them, and evaluates the results himself; the teacher acts as a facilitator. The method is aimed at

developing responsibility, independence, and the skills of planning and controlling one's own activities, that is, motivational-value and reflexive criteria.

Methods that support cognitive and independent learning

In a flipped classroom, theoretical material (video, presentation, article) is studied independently before the lesson, and during the lesson, problem tasks, discussions and project work are carried out. This encourages the student to independently analyze the information and apply it in the lesson, that is, it serves as a cognitive criterion. In micro-learning, the material is divided into blocks in the form of a 5–10-minute video, short text or interactive task, and a mini-test is given after each block; this can reduce the cognitive load and help to gradually master knowledge

Social learning relies on communication and collaboration: forums, group discussions, team projects, and online collaboration platforms are used, where students evaluate and provide feedback on each other's work. The association of social engagement with learning in online environments (Richardson et al., 2017) allows this method to be seen as a tool that supports cognitive and reflexive criteria.

The WIH model systematizes a new topic through six questions (what, where, how, when, why, how); the student answers the questions according to his capabilities and level of knowledge. The “system operator” method helps to reveal the structure, internal and external relationships of an object; for example, the essence of a concept is expressed in a five-line structure like a syncwine (one word, two words, three words, four words and one synonym). Both methods are related to the cognitive criterion and are designed to bring knowledge into a holistic system.

Creative methods

In project-based learning, students work in groups on a real-world problem or project topic, collect information, analyze, and present the results; they use various digital tools (e.g., Canva, Padlet, Google Classroom, Scratch) during their work. According to Papert's (1980) constructivism, the process of creating a product reinforces knowledge, therefore this method serves creative and cognitive criteria.

The SCAMPER model is aimed at developing new ideas and requires identifying seven questions: what to replace, what to combine, what to adapt, how to improve, what to change, how to apply again, what to recreate. In the “Focal Objects” method, the signs of several randomly selected objects are transferred to the main object and new ideas are found through their unexpected combination. These methods are designed to develop associative and creative thinking, that is, the creative criterion

Table 1. *Mechanism of Selected Methods and Criteria for Development*

Method	Main mechanism	Criterion	Expected result
Blended learning	A combination of asynchronous independent learning, synchronous interactive training, and contact sessions	Cognitive, reflexive	Strengthening independent learning and information processing skills
Reverse class	Theory before class, practical and problem tasks in the classroom	Cognitive	Independent analysis of information and application in the lesson
Gamification	Points, levels, rankings and	Motivational-	Increased activity and

	competition elements	valuable	interest
Micro-teaching	Divide the material into 5–10 minute blocks, with a mini-test after each block	Cognitive	Reduced cognitive load, gradual mastery
Social learning	Forum, group discussion, peer assessment	Cognitive, reflexive	Critical thinking and collaboration skills
Independently managed learning	The student creates, implements, and evaluates their own plan	Motivational-valued, reflexive	Responsibility, independence and self-management
Project-based learning	Solving a real problem with digital tools in a group	Creative, cognitive	Practical product creation and problem analysis
SCAMPER	Idea generation through seven questions (replacement, combination, adaptation, etc.)	Creative	Developing new ideas
WIH	Systematizing the topic through six questions (what, where, how, when, why, how)	Cognitive	Acceptance of a new topic and systematization of knowledge
System operator	Revealing the structure and relationships of an object in structures such as syncwine	Cognitive, reflexive	Systematization of knowledge about the object
Focal objects	Move random object symbols to the topic	Creative	Associative and creative thinking

Note: The table is an analytical summary by the author; the “expected outcome” has not been measured with empirical data.

Performance evaluation framework

The effectiveness of the selected methods can be assessed according to four criteria and three levels. In the motivational-value criterion, the creative level is characterized by the adoption of digital technologies as a means of generating new ideas and a high internal motivation for continuous learning, while the reproductive level is characterized by the use of technologies only for mandatory tasks.

In the cognitive dimension, the creative level is expressed in analyzing complex information and proposing new solutions, while the reproductive level is expressed in working according to ready-made instructions.

In the creative criterion, the creative level is determined by the creation of a new, original pedagogical product, while the reproductive level is determined by the repetition of samples.

In the reflexive criterion, the creative level is distinguished by a deep and critical analysis of one's own work and independent improvement, while the reproductive level is distinguished by relying only on the teacher's assessment. For statistical comparison, the levels can be expressed as 3, 4, and 5 points.

Discussion

It is clear from the description that each method is mainly focused on a specific criterion (Table 1); therefore, instead of relying on a single method, it is considered appropriate to combine them in a single structure of blended learning. This view is consistent with the idea of viewing digital thinking as a multi-component competence that encompasses motivation, cognition, creativity and reflection, rather than just a technical skill (Eshet-Alkalai, 2004; Wing, 2006).

When implementing methods, it is necessary to take into account a number of limitations: teachers' digital competence (Krumsvik, 2008), increased cognitive load, technical barriers, digital security and digital inequality. If technology is used only for "modern appearance", pedagogical effectiveness is not expected; the choice of method should be based on the learning objectives and the needs of the students.

The main limitation of the article is that it is based on a theoretical description: the impact of the methods on numerical thinking has not been measured here with empirical data, therefore, expressions such as “expected”, “intended” are used. The description of the methods also relies on the author's methodological developments, and for some methods, additional international sources are needed. Further research should conduct experiments with experimental and control groups, verify the reliability of the assessment criteria, and study the long-term stability of the effect.

Conclusion and recommendations

The article describes the didactic potential of eleven innovative methods selected for the development of digital thinking in students. Gamification and self-directed learning are motivational, flipped classroom, micro-learning, social learning, WIH and “System Operator” are cognitive, project-based learning, SCAMPER and “Focal Objects” are creative, self-directed and social learning are aimed at supporting the reflexive criterion. Blended learning serves as a unifying structure for these methods.

Practical recommendations: (1) when choosing methods, take into account which criterion they are aimed at and do not rely on one criterion; (2) sequentially combine methods in asynchronous, synchronous, and contact-session forms of blended learning; (3) regularly diagnose students' digital thinking according to four criteria and three levels; (4) verify the effectiveness of methods in experimental studies.

Declarations

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DEVELOPING THE PROFESSIONAL COMPETENCIES OF PROSPECTIVE PRIMARY SCHOOL TEACHERS IN AN INFORMATION-RICH EDUCATIONAL ENVIRONMENT

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Abstract. *The preparation of prospective primary school teachers requires the integration of subject-specific pedagogy, digital literacy and reflective professional judgement. This conceptual study aims to substantiate a competence-development model for teacher education within an information-rich educational environment. The study uses comparative document analysis and conceptual synthesis of the technological pedagogical content knowledge (TPACK) framework, the European Digital Competence of Educators framework (DigCompEdu), the UNESCO ICT Competency Framework for Teachers, and selected research on initial teacher education. The proposed model comprises four interdependent components: motivational-value, cognitive, activity-technological and reflective. The analysis identifies four corresponding pedagogical conditions: embedding digital tasks in subject-methodology courses, authentic project-based design, supervised school practice and reflective e-portfolios. A matrix of observable indicators and a three-level assessment rubric are proposed to support curriculum planning and subsequent empirical testing. The contribution is a context-sensitive design for preparing primary teachers in Uzbekistan that treats digital technologies as means for inclusive, age-appropriate teaching rather than as ends in themselves. Because no field experiment or student-level measurements are reported, the effectiveness of the proposed model remains a hypothesis for future evaluation.*

Keywords: *prospective primary school teachers; professional competence; information-rich educational environment; digital pedagogical competence; TPACK; DigCompEdu; teacher education.*

INTRODUCTION

The expansion of digital educational resources has changed the professional tasks of primary school teachers. Alongside selecting subject content and organising classroom interaction, teachers increasingly evaluate online materials, prepare accessible multimodal explanations, protect children’s personal information and interpret digitally generated assessment evidence. These responsibilities are especially consequential in primary education: learners require developmental appropriateness, guided interaction and a balance between screen-based activities and direct experience. Accordingly, professional competence cannot be reduced to the ability to operate educational software.

Uzbekistan’s Law “On Education” (2020) establishes the legal foundations of educational provision, while the national higher education development concept (President of the Republic of Uzbekistan, 2019) and “Digital Uzbekistan–2030” strategy (President of the Republic of

Uzbekistan, 2020) provide a policy context for educational modernisation and digital skills. These documents justify attention to pedagogically purposeful technology use, but do not themselves demonstrate the effectiveness of any particular university training model. For prospective primary teachers, the design problem is to connect digital resources with subject methodology, child development, inclusive pedagogy and professional responsibility.

The international literature offers complementary perspectives. Technological pedagogical content knowledge (TPACK) conceptualises competent technology integration as an interaction between knowledge of technology, pedagogy and subject matter (Mishra & Koehler, 2006; Koehler & Mishra, 2009). DigCompEdu extends the discussion to professional engagement, digital resources, teaching and learning, assessment, learner empowerment and the facilitation of learners' digital competence (Redecker, 2017). The UNESCO ICT Competency Framework for Teachers (UNESCO, 2018) links teacher knowledge and practice to institutional and system development. However, translating these broad frameworks into observable learning outcomes for the preparation of primary teachers requires additional didactic specification.

The aim of this article is to develop and substantiate a four-component model of professional competence for prospective primary school teachers in an information-rich educational environment, identify the pedagogical conditions needed for its implementation, and propose indicators for a future empirical evaluation. The article addresses the composition of competence, the relationship between teacher-education activities and expected learning outcomes, and the evidence that would be necessary to test the model. It presents a conceptual result rather than claims of experimentally established effectiveness.

MATERIALS AND METHODS

The research design was qualitative and conceptual. The source base consisted of three international frameworks (TPACK, DigCompEdu and UNESCO ICT-CFT), peer-reviewed studies on prospective teachers' technology integration and professional beliefs, the UNESCO 2023 Global Education Monitoring Report, and three Uzbek policy documents relevant to education and digitalisation. Sources were selected for their relevance to teacher preparation and conceptual coverage; this was not a systematic review, and no comprehensive database search or quantitative meta-analysis was undertaken.

The analysis proceeded in four linked steps. First, competence domains and pedagogical assumptions were identified within each framework. Second, overlapping concepts were grouped according to their function in professional activity: disposition and responsibility, theoretical understanding, application to teaching, and reflective improvement. Third, these groups were operationalised as activities and observable artefacts for primary education, including lesson plans, digital resources, teaching observations and e-portfolio entries. Fourth, the resulting mapping was checked for alignment between the proposed competence components, training conditions and assessment evidence. The mapping is an author-developed analytical synthesis, not a validated measurement instrument.

The unit of analysis was the competence domain or pedagogical strategy described in the selected sources, not an individual student. No participants were recruited, questionnaires administered or experimental groups compared in the present study. Consequently, inferential statistics and numerical claims of intervention impact are not applicable. A prospective assessment rubric is presented to make the model operationally testable in subsequent research.

RESULTS

1. Structure of the proposed professional competence model

The synthesis supports a working definition of professional competence as an integrated capacity to plan, implement, evaluate and improve primary school teaching using information resources in a purposeful, ethical and developmentally appropriate manner. Four mutually related components specify this capacity. The motivational-value component covers professional initiative, commitment to equitable access and responsible treatment of children's digital safety. The cognitive component comprises knowledge of subject pedagogy, child development, digital-resource affordances and limitations. The activity-technological component refers to the production and instructional use of resources and learning evidence. The reflective component concerns the critical analysis of teaching decisions and the revision of practice.

Table 1 translates these components into learning outcomes and assessable evidence. The indicators are suggested for use in a curriculum and should not be interpreted as psychometrically validated scales.

Table 1. Components, observable indicators and proposed evidence

Component	Observable indicators	Potential assessment evidence
Motivational-value	Explains the purpose of technology; considers access and child safety.	Lesson rationale; safety checklist; reflection.
Cognitive	Selects age-appropriate resources; aligns subject content, pedagogy and access.	Applied knowledge task; resource comparison.
Activity-technological	Designs aligned digital tasks; adapts resources for diverse learners.	Digital task; observed lesson; assessment artefact.
Reflective	Uses feedback to diagnose and revise instruction.	Mentor comments; revised plan; e-portfolio.

The distinction between components is analytical rather than absolute. For example, designing a vocabulary activity using an interactive platform requires knowledge of early literacy, practical selection of a resource, concern for learner access and post-lesson reflection. This interdependence is a central assumption of the model and corresponds to the integrative logic of TPACK (Mishra & Koehler, 2006).

2. Pedagogical conditions for implementation

Four conditions are proposed as a coherent sequence within university-based teacher education. The first is curricular integration: digital activities should be embedded in the methodology of teaching literacy, mathematics and introductory science, rather than confined to a disconnected computing course. A student might compare two digital phonics resources against the same early-reading objective and justify a selection with regard to pace, cognitive load and accessibility.

The second condition is authentic project-based resource design. Working individually or collaboratively, prospective teachers can create a short educational video, interactive worksheet or formative quiz for a specified year group. Their work is judged primarily by instructional alignment, clarity, age appropriateness and accessibility, not the number of software features used.

Learning technology through design and authentic pedagogical situations is supported by the synthesis of Tondeur et al. (2012).

The third condition is supervised school placement involving observation, instructional rehearsal and feedback from a mentor teacher. School placement enables students to reconsider whether a resource that appears suitable during university coursework is workable in a class with time constraints, varied literacy levels and unequal device access. The fourth condition is a reflective e-portfolio in which students collect lesson designs, resource evaluations, observation notes and evidence of revision. This approach links reflection to identifiable professional decisions rather than treating it as a general self-rating exercise.

Table 2 links each condition with a feasible implementation activity and an observable output. The suggested tasks are examples for programme design, not activities claimed to have been completed by a participant sample.

Table 2. Proposed implementation matrix for teacher-education programmes

Condition	Example of learning activity	Expected documented output
Integration in subject methodology	Combine virtual and concrete manipulatives in a numeracy lesson.	Annotated lesson plan and resource rationale.
Project-based design	Create a language-learning resource using accessibility and safety checks.	Resource prototype and peer-review record.
Mentored teaching practice	Teach and observe a lesson; examine learner participation.	Mentor notes and revised teaching sequence.
Reflective e-portfolio	Document two task iterations and justify changes with evidence.	Portfolio with artefacts and development goals.

3. Prospective assessment and verification procedure

To assess the proposed components in a future implementation study, each indicator can be scored using a three-level analytic rubric: emerging (1), developing (2) and proficient (3). At the emerging level, the student selects a resource without a defensible instructional rationale or overlooks a foreseeable accessibility or safety concern. At the developing level, the student gives a plausible explanation and produces a partially aligned activity but requires guidance to revise it. At the proficient level, the student independently substantiates the choice, anticipates learner differences and uses teaching evidence to improve the activity. These descriptors must be elaborated for each indicator before formal data collection.

A feasible validation sequence would include expert review of rubric content, a small pilot to assess the clarity of scoring criteria, initial and final assessment of comparable learning tasks, and review of assessor agreement. Only after documenting sampling, implementation fidelity and suitable analytical methods could a later study draw conclusions about gains in professional competence. In the current article, the rubric and sequence are methodological proposals; no gain scores, significance tests or causal effects are reported.

DISCUSSION

The proposed model consolidates, rather than replaces, established international approaches. TPACK provides an explanation of knowledge integration, while DigCompEdu offers

a more detailed view of professional digital activity, learner support and assessment (Redecker, 2017). UNESCO ICT-CFT connects educators' digital competence to organisational conditions (UNESCO, 2018). The four-component arrangement gives these domains a teachable structure for initial primary teacher education by linking values, understanding, performance and reflective judgement to specific learning evidence.

Its emphasis on demonstration and mentoring is consistent with Tondeur et al. (2012), whose synthesis highlighted role modelling, authentic experiences and reflection in prospective teacher preparation. Instefjord and Munthe (2017) likewise examined how digital professional competence is integrated into initial teacher education, underlining the relevance of the institutional preparation environment. Ertmer and Ottenbreit-Leftwich (2010) showed why competence development must also address beliefs and confidence; technical training alone does not automatically produce meaningful classroom integration.

An important qualification concerns the educational value of digitalisation itself. The UNESCO Global Education Monitoring Report (2023) emphasises that technology should serve learners' interests and be assessed with regard to relevance, equity, scale and sustainability. For primary education, this suggests a critical selection principle: a digital tool should be chosen only when it improves a specified learning opportunity without introducing disproportionate barriers. Offline alternatives, inclusive materials, privacy protection and direct teacher–pupil interaction remain relevant criteria even when an institution has extensive digital infrastructure.

The model has three limitations. First, it is the product of a targeted conceptual synthesis, so the selection of sources may omit alternative theoretical formulations. Second, its indicators have not undergone expert content validation, inter-rater reliability testing or construct validation. Third, the proposed conditions have not been implemented or experimentally compared in the present research. They should therefore be regarded as theoretically justified design propositions rather than evidence of improved learning outcomes. A subsequent mixed-methods study across more than one teacher-education institution could examine practicality, differences between contexts and longer-term transfer to school teaching.

CONCLUSION

The theoretical analysis specifies professional competence in an information-rich educational environment as the interaction of four components: motivational-value, cognitive, activity-technological and reflective. This structure places digital resources within the broader professional task of teaching primary school children responsibly, effectively and inclusively. The article's principal result is an operational model that links each component to indicators, assessment artefacts and a feasible sequence of teacher-education activities.

For teacher-education programmes in Uzbekistan, the practical implications are to integrate pedagogically justified digital tasks into subject-methodology courses, use authentic resource-design projects, provide mentored opportunities to test those resources in classrooms and assess professional growth through documented reflection. Before the model is described as effective, higher education institutions should pilot and validate the proposed rubric and evaluate actual student performance with transparent sampling and analysis procedures. Such verification would establish whether the conceptual framework produces measurable benefits in primary teacher preparation.

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A METHODOLOGICAL MODEL AND PEDAGOGICAL CONDITIONS FOR DEVELOPING PEDAGOGICAL TOLERANCE AMONG PRE-SERVICE TEACHERS IN DIGITAL LEARNING ENVIRONMENTS

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Abstract. *This article develops a theoretically grounded methodological model for fostering pedagogical tolerance among pre-service teachers in digital learning environments. The study addresses the gap between general declarations of tolerance and observable professional actions in online communication, collaborative learning, and conflict resolution. A conceptual and comparative analysis of international frameworks for democratic culture, intercultural competence, digital pedagogy, and teacher education was used to construct the model. The proposed framework comprises five interconnected components: goal-motivational, content-axiological, technological-activity, communicative-reflective, and diagnostic-corrective. Five enabling pedagogical conditions are identified, including psychologically safe dialogue, inclusive digital design, scenario-based reflection, active instructional moderation, and responsible data practices. A criterion-based assessment matrix is offered to distinguish cognitive, axiological, communicative, conflict-management, and reflective manifestations of tolerance. The contribution is a coherent instructional design linking ethical dispositions to assessable pedagogical practices. As the model has not yet been subjected to expert validation or controlled implementation, the article makes no claims about experimentally demonstrated effectiveness; it specifies an empirically testable framework for subsequent research.*

Keywords: *digital learning environment; pre-service teachers; pedagogical tolerance; teacher education; methodological model; intercultural competence; reflective practice; inclusive communication.*

Аннотация. *В статье предложена теоретически обоснованная методическая модель развития педагогической толерантности будущих учителей в цифровой образовательной среде. Цель исследования заключается в установлении связи между ценностными основаниями толерантности и наблюдаемыми профессиональными действиями в ситуациях цифрового общения, совместной учебной деятельности и разрешения конфликтов. На основе концептуального и сравнительного анализа международных научных и методических источников выделены пять взаимосвязанных компонентов модели: целевой-мотивационный, содержательно-аксиологический, технологически-деятельностный, коммуникативно-рефлексивный и диагностико-коррекционный. Определены педагогические условия ее реализации и критерии оценки проявлений толерантности. Предложенная модель представляет собой концептуальную разработку; ее результативность не подтверждалась экспериментально и требует дальнейшей проверки.*

Ключевые слова: *цифровая образовательная среда, будущие учителя, педагогическая толерантность, педагогическое образование, методическая модель, межкультурная компетентность, рефлексия, инклюзивная коммуникация.*

1. INTRODUCTION

The expansion of digital infrastructures in higher education has changed not only the delivery of instructional content but also the social conditions under which future teachers learn to interact with others. Discussion boards, learning management systems, virtual classrooms, shared documents, and algorithmically mediated communication create opportunities for sustained dialogue across differences. At the same time, they may amplify misunderstandings, exclusionary participation patterns, insensitive language, and poorly managed disagreement. For teacher education, these are not peripheral issues: they influence how prospective educators understand learners, exercise authority, respond to diversity, and maintain a respectful classroom climate. UNESCO's 2023 Global Education Monitoring Report stresses that technology should serve educational purposes and learners' interests rather than determine them [1]. Consequently, digital competence must be considered in conjunction with professional ethics and interpersonal judgment.

Pedagogical tolerance is understood here as an integrated professional capacity to recognise differences in learners' experiences and viewpoints, safeguard dignity and equitable participation, interpret disagreement without stereotyping, and respond through principled, evidence-informed dialogue. It does not require accepting discriminatory practices or treating all claims as equally valid. Rather, it entails a combination of ethical commitments, interpretive knowledge, communicative skills, and reflective decision-making. This understanding resonates with the Council of Europe's Reference Framework of Competences for Democratic Culture, which associates the functioning of democratic and intercultural settings with values, attitudes, skills, and knowledge [2]. In professional teacher preparation, such competence must be cultivated through designed learning experiences instead of being assumed to emerge automatically from exposure to technology.

Existing scholarship supplies substantial resources for this task, yet its central frameworks are often applied separately. Digital-teaching models explain how educators select and integrate technology [3–5]; intercultural competence research describes dispositions and behaviours associated with effective interaction across differences [6, 8]; and work on intergroup contact or online inquiry identifies contexts in which dialogue may support understanding [7, 9]. A methodological gap arises when these insights are not translated into linked instructional components, explicit learning tasks, and observable assessment criteria tailored to pre-service teachers. This article addresses that design problem without presenting a field experiment or claiming that the proposed solution has already been validated.

The research objective is to develop a theoretically justified methodological model and identify the pedagogical conditions under which it could be implemented in digital teacher-education environments. The study has three tasks: to clarify the structure of pedagogical tolerance as a professional competence; to relate its development to specific digitally mediated teaching activities; and to formulate criteria for assessing its observable manifestations. The focus is on the design logic of professional preparation rather than the measurement of students' existing tolerance levels. In this respect, the article contributes a conceptual and methodological proposal suitable for subsequent expert review and pilot testing.

2. MATERIALS AND METHODS

This study adopted a conceptual-analytical design based on established scholarly contributions and guidance documents relevant to teacher preparation, democratic culture, intercultural competence, and digital learning. The corpus comprised the UNESCO Global Education Monitoring Report and the UNESCO ICT Competency Framework for Teachers [1, 3], the Council of Europe framework [2], DigCompEdu [4], the technological pedagogical content knowledge framework [5], influential work on intercultural competence [6, 8], intergroup contact [7], the community-of-inquiry perspective on online education [9], and guidance on generative artificial intelligence in education [10]. These sources were chosen for their conceptual relevance and institutional or scholarly standing. The selection was purposive rather than exhaustive; it must therefore not be interpreted as a systematic review or meta-analysis.

Four complementary analytical procedures were employed. First, conceptual analysis distinguished pedagogical tolerance from unrestricted agreement, interpersonal politeness, and generic digital literacy. Second, comparative mapping examined overlaps and differences between democratic-cultural, intercultural, and digital-pedagogical frameworks. Third, functional modelling linked the identified competencies to instructional inputs, learning processes, assessment evidence, and feedback mechanisms. Fourth, a scenario-based design procedure translated abstract qualities into sample learning tasks and indicators that could be observed in prospective teachers' written and oral digital interactions. The proposed relations between components are reasoned design propositions, not estimates of causal effects.

The model was developed through an explicit logic of alignment: each stated educational aim should have a corresponding activity and at least one assessable behavioural indicator. For instance, the aim of handling disagreement without personal attack is connected to a moderated online discussion task and assessed through the quality of clarification questions, evidence-based responses, and attention to participation rights. This alignment approach makes the framework more transparent and potentially testable. No interviews, classroom observations, questionnaires, intervention trials, expert Delphi panel, or statistical inference were performed for the present article; any empirical claim would exceed the available evidence.

3. RESULTS

3.1. Functional dimensions of pedagogical tolerance

The conceptual synthesis suggests four interdependent dimensions of pedagogical tolerance. The axiological dimension includes commitments to human dignity, fairness, educational accessibility, and respect for legitimate differences. The cognitive dimension involves awareness of cultural and individual variation, recognition of stereotypes, and the ability to consider alternative explanations of another person's conduct. The communicative-behavioural dimension becomes visible in listening, neutral reformulation, reasoned disagreement, supportive responses, and fair moderation of participation. The reflective dimension concerns recognising one's assumptions, revising judgments in the light of evidence, and taking responsibility for the effects of one's professional decisions. These dimensions should be interpreted jointly: declarative respect without fair action is insufficient, while superficially polite behaviour without reflective judgment may be unstable across contexts.

A digitally mediated teaching context changes the opportunities for manifesting each dimension. Text-based discussion leaves a reviewable record that can facilitate reflection, yet it provides fewer non-verbal cues and may cause a delayed response to be misconstrued. Collaborative online documents permit distributed participation, but unequal access and editing

practices may marginalise less confident students. Synchronous meetings allow rapid clarification while potentially privileging those with stable connectivity, speaking confidence, and similar language backgrounds. Therefore, the educational value of a platform depends on how educators arrange participation, moderate interaction, and evaluate the evidence produced within it. Tolerance should be developed across several communication modes rather than treated as a platform-specific etiquette skill.

3.2. Structure of the proposed methodological model

The central result of the conceptual study is a five-component methodological model that integrates educational goals, value-based content, enacted digital practices, reflection, and formative assessment. Its components are connected by a feedback cycle: diagnostic evidence informs the selection of tasks, interactions generate new evidence, and guided reflection supports subsequent improvement. Unlike an additive collection of workshops, the model requires congruence between the intended competence and the activities used to cultivate it. Table 1 presents the proposed structure and example evidence sources.

Table 1. Components and evidence sources of the proposed methodological model

Component	**Developmental function**	**Digital activity and evidence**
Goal-motivational	Establish professional responsibility and individual learning goals	Initial response to a problematic case; written learning objectives
Content-axiological	Connect tolerance, equal participation, rights, and digital ethics	Co-authored dialogue rules; exercises separating evidence from stereotypes
Technological-activity	Practise respectful disagreement and collaborative conflict management	Moderated forum; role-play; collaborative document
Communicative-reflective	Develop perspective-taking, listening, and revision of judgments	Peer responses; reflective log; dialogue transcript
Diagnostic-corrective	Examine observable behaviour and provide targeted feedback	Analytic rubric; portfolio; observation checklist

The goal-motivational component begins with recognition that tolerance is part of professional responsibility, not merely a desirable personal trait. Students examine a problematic online classroom situation, justify their initial response, and specify one or two behavioural objectives for improvement. The content-axiological component introduces ethical and conceptual distinctions required to interpret that situation: disagreement versus discrimination, equitable access versus identical treatment, and evidence versus assumption. The technological-activity component provides structured opportunities to enact these distinctions in asynchronous forums, shared documents, and moderated case discussions. The communicative-reflective component requires students to consider how their language affected others and to revise selected responses. Finally, the diagnostic-corrective component translates observations into formative feedback and targeted subsequent tasks.

3.3. Pedagogical conditions for implementation

The first enabling condition is a psychologically safe and normatively transparent digital learning environment. Participants should know that ideas may be challenged, but humiliating labels, discriminatory statements, unauthorised disclosure of personal information, and persistent interpersonal aggression are unacceptable. Rules should be explained through concrete cases and, wherever feasible, discussed with students as shared commitments. Transparent moderation promotes predictability and makes the educational purpose of intervention visible. Such a condition is particularly important when students are asked to engage with contested social issues or to acknowledge uncertainty before their peers.

The second condition concerns inclusive instructional design. A single communication mode or rigid response window may disadvantage students because of connectivity, disability, language proficiency, family responsibilities, or communication preferences. Where pedagogically appropriate, participation should be possible through carefully designed written, spoken, or visual contributions. Accessible document formats, advance instructions, manageable task loads, and sufficient reflection time reduce avoidable barriers. Importantly, flexibility should not dilute standards for evidence, respect, or individual accountability. The intent is to distinguish an educationally meaningful competence from an arbitrary ability to respond rapidly on a particular platform.

The third condition is scenario-based learning coupled with structured reflection. An abstract call to “be tolerant” provides little guidance when a student encounters a derogatory joke, an exclusionary team decision, or a strongly worded disagreement in a virtual classroom. Scenario-based tasks make the relevant professional choice explicit: identify affected parties, determine the harm or participation problem, compare alternative responses, and justify a proportionate intervention. Reflection follows the decision rather than replacing it. Written explanations of assumptions and revised responses provide evidence that can inform an educator’s feedback. Reflective tasks should avoid compelled disclosure of personal beliefs or private experiences.

The fourth condition is active, impartial, and developmentally oriented teacher moderation. Moderation should neither enforce artificial consensus nor allow interpersonal harm to be reframed as ordinary discussion. The teacher’s role is to request clarification, encourage substantiation, make space for quieter participants, separate criticism of ideas from attacks on persons, and redirect a discussion when learning goals are displaced. Questions such as “Which part of the argument is supported by evidence?” and “How could this response be reformulated without excluding the speaker?” model disciplined dialogue. Educators should also explain their own decisions so that future teachers can learn the professional reasoning behind an intervention.

The fifth condition is the integration of digital ethics and responsible information practices. Learning-management records, forum contributions, video recordings, and assessment portfolios may include identifiable data; access and retention should therefore be limited to legitimate educational purposes. Students should understand when materials will be recorded, who can view them, and how they will be assessed. AI-assisted drafting or moderation may introduce new risks, including biased interpretations and opaque feedback. UNESCO’s guidance on generative AI emphasises human-centred educational safeguards and critical attention to such technologies [10]. Automated outputs, if used, should remain subordinate to accountable teacher judgment and institutional rules.

3.4. Implementation sequence and assessment criteria

Four iterative stages are proposed. At the diagnostic-motivational stage, students analyse a short online-interaction case and establish individual learning objectives. At the conceptual-preparatory stage, they examine principles of dignity, diversity, evidence-based disagreement, and digital citizenship, while collaboratively developing criteria for constructive participation. At the activity-reflection stage, students conduct moderated discussions, collaborative problem-solving, or role-playing, followed by self-assessment and peer feedback. At the evaluation-correction stage, the teacher reviews collected artefacts against behavioural criteria, identifies developmental needs, and adjusts the next task. Because learning in complex social situations is nonlinear, the sequence may be revisited rather than applied as a once-only linear intervention.

For example, in a case entitled “Responding to a different opinion in an online class”, a student gives an unexpected answer and several classmates post mocking replies. Pre-service teachers first identify the responsibilities of the teacher and the participation rights of the learner. They then write three candidate interventions: an immediate public response, an individual follow-up, and a subsequent class-level discussion. After comparing the alternatives for proportionality, safety, and educational value, they draft a neutral intervention and explain why it would support participation without suppressing reasoned disagreement. A reflective prompt asks which initial assumptions influenced their choice. This task creates inspectable evidence of professional decision-making while keeping the activity hypothetical and ethically low-risk.

Assessment should privilege observable professional acts over broad self-labels such as “tolerant” or “intolerant”. The proposed criterion matrix in Table 2 connects five aspects of pedagogical tolerance to indicators and evidence sources. A combination of case analysis, interaction records, reflection logs, and instructor observations is preferable to a single self-report measure, since each source captures a different part of the construct. Assessors should evaluate the quality of a demonstrated response in context and refrain from equating one poorly framed message with a fixed personality characteristic.

Table 2. Proposed assessment criteria and observable indicators

Criterion	Observable indicator	Potential evidence
Cognitive	Distinguishes assumptions from evidence and considers plausible alternative interpretations	Case analysis; written justification
Axiological	Accounts for learner dignity, fairness, and equitable participation in decisions	Reasoning behind pedagogical choices
Communicative	Uses respectful language, clarification questions, and accurate paraphrasing	Forum messages; observation checklist
Conflict-management	Addresses disagreement without personal attacks and proposes proportionate responses	Role-play; comparison of alternative actions

Criterion	Observable indicator	Potential evidence
Reflective	Identifies bias in initial judgments and revises responses with explicit reasons	Reflective journal; before-and-after responses

A developmental rubric may distinguish four performance levels: emerging, developing, consistent, and context-sensitive. At the emerging level, a response is dominated by unexamined assumptions or lacks attention to another participant's dignity. A developing response acknowledges competing perspectives but applies criteria inconsistently. A consistent response gives an evidence-based, respectful justification and considers participation rights. At the context-sensitive level, the student adapts the response to the specific social, pedagogical, and technological constraints and provides a reasoned account of trade-offs. Such level descriptors constitute preliminary design recommendations; their reliability, discriminant validity, and interpretability would need to be evaluated before use in high-stakes assessment.

4. DISCUSSION

The proposed model contributes a bridge between normative competence frameworks and the everyday decisions required in digital classrooms. Deardorff's work identifies attitudes, knowledge, and skills as interrelated elements of intercultural competence and supports the use of multiple assessment methods [6]. The Council of Europe framework likewise conceptualises democratic culture through interconnected competences [2]. In the present model, these ideas are not reproduced as independent checklists; rather, they are linked to instructional tasks that make professional conduct visible. A pre-service teacher is asked not only to endorse fairness but also to produce an actionable response when participation becomes inequitable or disagreement turns personal.

This contribution also needs to be located within the literature on technology integration. The TPACK framework draws attention to the intersection of technological, pedagogical, and content knowledge [5], while DigCompEdu outlines educators' digital competences in teaching, learning, assessment, and learner empowerment [4]. Neither framework, considered alone, guarantees culturally responsive or non-discriminatory communication. The proposed model therefore treats technological choice as part of pedagogical judgment: the educator decides which communication mode, moderation procedure, and assessment artefact best allows students to demonstrate respectful engagement. The resulting position is compatible with UNESCO's insistence that educational goals should govern technological decisions [1, 3].

The framework further suggests why a digital platform cannot itself be credited with producing tolerance. Evidence from intergroup contact research indicates that the effects of contact depend on its conditions and qualities [7]; online interaction may likewise be productive or counterproductive according to task structure and social norms. The community-of-inquiry perspective highlights the role of purposeful teaching and social engagement in text-based learning environments [9]. A moderated, evidence-oriented discussion may provide opportunities for perspective-taking; an unstructured exchange may instead reward confrontation or silence less confident participants. For this reason, the model specifies procedural conditions and feedback loops rather than simply recommending more online interaction.

Three methodological limitations are central. First, the article presents a purposive conceptual synthesis, not a comprehensive systematic review of the evidence. Second, the model

components and assessment rubric have not been subjected to expert consensus, content-validation procedures, or psychometric testing. Third, no comparative implementation has been conducted in teacher-education programmes, so claims of improved tolerance, sustained transfer, or causal effectiveness would be unjustified. The framework may also require adaptation across subject specialisations, institutional resources, cultural contexts, and the accessibility requirements of different student groups. These limitations should be acknowledged in any practical adoption or subsequent publication based on the same model.

A future empirical study could begin with cognitive interviews and expert review of scenario relevance, followed by pilot scoring of anonymised student responses. Inter-rater agreement, indicator redundancy, and potential bias across language backgrounds would require careful examination. An appropriately designed quasi-experiment could then compare model-based instruction with a content- and time-matched conventional approach, using pre-intervention and post-intervention assessments together with qualitative evidence from portfolios. The analysis should report effect sizes and uncertainty, not merely statistical significance, and consider whether any improvements persist or transfer to teaching practicum contexts. These are recommended steps for future investigation; none is reported as having been completed.

5. CONCLUSION

The study conceptualises pedagogical tolerance in digital teacher education as a professional competence consisting of value-based commitments, interpretive understanding, communicative action, and reflective judgment. On this basis, it proposes a five-component methodological model that aligns educational intentions with digital learning tasks and observable assessment evidence. The model is supported by five pedagogical conditions: safe and transparent dialogue; inclusive digital design; scenario-based, reflective learning; accountable moderation; and responsible treatment of personal information and AI-supported resources.

The practical implication is that teacher-education programmes can formulate explicit learning activities for respectful disagreement, equitable participation, and conflict response rather than relying on undifferentiated appeals to tolerance. Case-based discussion, guided peer feedback, and reflective portfolios offer potential assessment evidence when used with clear criteria and appropriate safeguards. Nevertheless, the proposed components and rubric remain theoretical design outcomes. Expert validation, pilot implementation, and comparative empirical evaluation are necessary before conclusions can be drawn about educational effectiveness. Accordingly, the principal contribution of the article is a transparent and testable methodological framework, not a claim of demonstrated intervention success.

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CRITERIA FOR ASSESSING STUDENTS' PROFESSIONAL COMMUNICATION COMPETENCE AND THE USE OF PORTFOLIO TECHNOLOGY

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Abstract. *The article deals with the problem of assessing university students' professional communication competence in English and the use of portfolio technology as a tool for formative and reflective assessment. It analyses the theoretical foundations of language assessment, including L.F. Bachman and A.S. Palmer's concept of test usefulness, D. Douglas's approach to assessing languages for specific purposes, the CEFR "can do" descriptors and the concept of assessment for learning developed by P. Black and D. Wiliam. The article substantiates the principles of assessing professional communication competence – authenticity, integrativeness, criterion-referencing, transparency and the combination of formative and summative assessment – and proposes an analytic rubric that includes task achievement, professional content, organisation and coherence, language range and accuracy, interaction and strategic competence, and sociocultural appropriateness. The structure and functions of a professional communication portfolio are described, and the roles of self-assessment and peer assessment are discussed. It is argued that combining criterion-based assessment with portfolio technology makes assessment an integral part of the learning process and contributes to the development of students' autonomy and professional communication competence.*

Keywords: *assessment, professional communication competence, assessment criteria, analytic rubric, portfolio, European Language Portfolio, self-assessment, peer assessment, formative assessment, ESP*

Introduction. Assessment is an integral part of any teaching methodology. It shows to what extent learning objectives have been achieved, provides feedback for students and teachers and largely determines what and how students learn. In foreign language teaching in non-linguistic universities, however, assessment is often limited to grammar and vocabulary tests, reading comprehension questions and translation tasks. Such assessment does not reflect the real requirements of professional communication and may even discourage students from developing their speaking and interaction skills, since these skills are rarely assessed.

The shift towards competency-based education requires a corresponding change in assessment. The Concept for the Development of the Higher Education System of the Republic of Uzbekistan until 2030 [1] emphasises the need to improve the quality of education and the objectivity of assessing students' knowledge and skills. The State Educational Standard for foreign languages in the continuous education system [2] defines target levels of foreign language proficiency on the basis of the CEFR. In this context, there is a need to develop valid criteria for assessing students' professional communication competence and tools that make assessment an integral part of learning.

The aim of this article is to analyse the theoretical foundations of assessing professional communication competence, to propose a set of assessment principles and criteria and to describe the use of portfolio technology as a tool for formative and reflective assessment.

Theoretical foundations of assessment. Modern language assessment is based on the communicative view of language ability. L.F. Bachman and A.S. Palmer [3] proposed the concept of test usefulness, which includes reliability, construct validity, authenticity, interactiveness, impact and practicality. Of particular importance for professional communication are authenticity, that is, the correspondence between assessment tasks and real-life language use, and interactiveness, that is, the extent to which the task engages the learner's language ability, topical knowledge and strategic competence. D. Douglas [4], who developed the theory of assessing languages for specific purposes, argues that in specific-purpose assessment language knowledge and background professional knowledge interact, and therefore assessment tasks should be based on an analysis of the target language use situation.

The CEFR [5] and its Companion Volume [6] describe language proficiency in terms of "can do" descriptors for reception, production, interaction and mediation, as well as qualitative aspects of language use such as range, accuracy, fluency, interaction and coherence. These descriptors provide a common reference point for formulating assessment criteria and make assessment transparent for students. S. Luoma [7] and G. Fulcher [8] show that assessing speaking requires clearly defined rating scales, trained raters and tasks that elicit the kind of language that is to be assessed. S.C. Weigle [9] similarly emphasises the importance of analytic scales for assessing writing, since they provide detailed diagnostic information.

An important change in assessment theory is the shift from assessment of learning to assessment for learning. P. Black and D. Wiliam [10], in their influential review, showed that formative assessment, which provides students with feedback and involves them in evaluating their own work, significantly improves learning outcomes. D. Boud and N. Falchikov [11] emphasise that assessment in higher education should develop students' capacity to judge the quality of their own work, which is essential for lifelong learning. Russian researchers V.I. Zvonnikov and M.B. Chelyshkova [12] also stress that modern assessment should combine traditional tests with authentic and portfolio-based assessment in order to evaluate competences rather than isolated knowledge.

Principles of assessing professional communication competence. On the basis of the theoretical analysis, the following principles of assessing students' professional communication competence can be formulated. The principle of authenticity requires that assessment tasks reproduce real professional communication situations, such as presentations, meetings, negotiations or business correspondence. The principle of integrativeness requires that tasks assess several skills and components of competence together, as they are used in real communication. The principle of criterion-referencing means that students' performance is assessed against clearly defined criteria and descriptors rather than compared with other students. The principle of transparency requires that criteria be known to students in advance and used for feedback and self-assessment. Finally, the principle of combining formative and summative assessment means that assessment is carried out not only at the end of a course but throughout the learning process, providing regular feedback.

Criteria for assessing professional communication competence. Taking into account the components of professional communication competence and the qualitative aspects of language use described in the CEFR, we propose an analytic rubric for assessing students' performance in

professional communication tasks (Table 1). Each criterion is assessed on a scale from 1 to 5, and descriptors are developed for each level.

Table 1. Analytic rubric for assessing professional communication competence

Criterion	**What is assessed**	**Descriptor of the highest level**
Task achievement	Fulfilment of the communicative goal and requirements of the professional situation	The communicative goal is fully achieved; all requirements of the task are met
Professional content	Accuracy, relevance and depth of professional information and arguments	Content is accurate, relevant and well supported with professional arguments and examples
Organisation and coherence	Structure of the speech or text, logical sequence, use of linking devices, genre conventions	Clear structure appropriate to the genre; ideas are logically connected
Language range and accuracy	Use of professional terminology, variety of structures, grammatical and lexical accuracy	Wide range of professional vocabulary and structures; errors are rare and do not impede communication
Interaction and strategic competence	Turn-taking, responding to partners, clarifying, managing the discussion	Interacts naturally, responds appropriately, uses strategies to maintain communication
Sociocultural appropriateness	Register, politeness, professional etiquette	Register and politeness strategies are fully appropriate to the situation and interlocutors

The proposed rubric can be used for assessing both oral and written professional communication tasks, with slight modifications. For example, in assessing a business email, the criterion “interaction and strategic competence” can be replaced by “reader awareness”. S.M. Brookhart [13] notes that good rubrics should describe qualities of performance rather than simply count errors, and should be used not only for grading but also for giving feedback and guiding students’ learning. Therefore, it is advisable to discuss the rubric with students at the beginning of the course and to use it regularly for self-assessment and peer assessment.

Portfolio technology in assessing professional communication. A portfolio is a purposeful collection of student work that shows the student’s efforts, progress and achievements in one or more areas. F.L. Paulson, P.R. Paulson and C.A. Meyer [14] emphasise that a portfolio must include student participation in selecting contents, the criteria for selection, the criteria for judging merit and evidence of student self-reflection. In language education, the European Language Portfolio was developed by the Council of Europe to support learner autonomy,

plurilingualism and self-assessment. D. Little [15] shows that the European Language Portfolio links the CEFR descriptors with learners' own judgements of their proficiency and thus involves them actively in the assessment process.

A professional communication portfolio can consist of three sections. The first section, the language passport, contains a summary of the student's language proficiency and self-assessment according to CEFR descriptors adapted to professional communication. The second section, the language biography, includes the student's learning goals, reflective notes on professional communication experiences and self-assessment checklists. The third section, the dossier, contains samples of the student's work: written texts (emails, reports, proposals), recordings of presentations and participation in simulated meetings or negotiations, project materials and feedback received from the teacher and peers. In modern conditions, it is convenient to maintain an electronic portfolio on a learning management system, which allows students to store audio and video recordings and the teacher to comment on them.

The portfolio performs several functions. Its diagnostic function allows the teacher and the student to identify strengths and weaknesses in professional communication. Its formative function ensures regular feedback and supports the gradual improvement of skills. Its reflective function develops the student's ability to analyse his or her own communication and set learning goals. Its motivational function increases students' interest by making their progress visible. Finally, its summative function allows the portfolio to be used as part of the final assessment, together with performance in authentic communication tasks.

Self-assessment and peer assessment. Self-assessment and peer assessment are essential components of portfolio-based assessment. Self-assessment helps students to understand the assessment criteria, to become aware of their own progress and to take responsibility for their learning. K. Topping [16], in his review of peer assessment in higher education, found that it can have positive effects on learning when students are trained to use criteria and when it is organised as a formative activity. In professional communication teaching, peer assessment can be organised after presentations, simulations or project defences, when students use simplified versions of the rubric to provide feedback to their classmates. Such activities also develop students' ability to give and receive constructive feedback, which is itself an important professional communication skill.

At the same time, self-assessment and peer assessment require careful organisation. Students should be trained in using criteria, their assessments should be compared with the teacher's assessment and discussed, and the results should be used primarily for learning rather than for grading. H.D. Brown and P. Abeywickrama [17] emphasise that alternative assessment methods are most effective when they are combined with traditional methods and used in accordance with clearly defined purposes. As J.J. Jalolov [18] notes, the control of learners' achievements in foreign language teaching should be organised so that it stimulates their communicative activity.

Conclusion. Assessing students' professional communication competence requires a shift from traditional tests of language knowledge to authentic, integrative and criterion-referenced assessment. The theoretical foundations of such assessment are provided by the concept of test usefulness, the theory of assessing languages for specific purposes, the CEFR descriptors and the concept of assessment for learning. The proposed principles – authenticity, integrativeness, criterion-referencing, transparency and the combination of formative and summative assessment – and the analytic rubric covering task achievement, professional content, organisation and coherence, language range and accuracy, interaction and strategic competence and sociocultural

appropriateness make it possible to assess professional communication competence comprehensively and objectively.

Portfolio technology, consisting of a language passport, a language biography and a dossier, complements criterion-based assessment and performs diagnostic, formative, reflective, motivational and summative functions. Combined with self-assessment and peer assessment, it makes assessment an integral part of the learning process, develops students' autonomy and reflective skills and contributes to the development of their professional communication competence.

Further research will focus on developing detailed level descriptors for the proposed rubric for different professional fields and on designing an electronic portfolio of professional communication for university students.

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CORRELATIONAL ANALYSIS OF CHARACTER ACCENTUATION AND EMPATHY DISPOSITION AMONG ADOLESCENTS

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Abstract. *This study examines the psychological relationship between character accentuations (per G. Schmieshek) and empathy dimensions (per I.M. Yusupov) among 7th and 9th-grade students in Uzbekistan. Data from Fargona and Namangan regions indicate that 9th-grade adolescents exhibit higher levels of social empathy towards strangers compared to younger cohorts. Statistical analysis reveals a significant positive correlation between the* ***Emotive*** *accentuation type and all empathy dimensions, particularly in female students. Conversely, the* ***Excitable*** *(Vozbudimiy) type shows a negative correlation with empathy towards animals and social responsibility. These findings suggest that character traits are decisive factors in the emotional development and social integration of adolescents.*

Keywords: *character accentuation, demonstrative type, empathy, person, individual psychology, emotive type, stenic type, temperament, sensitive period.*

INTRODUCTION

Psychological research on character traits, temperament, and personality typology in adolescents is increasingly gaining global significance. This is because character traits formed during adolescence play a pivotal role in an individual's subsequent development and socialization process. Recent psychological observations and studies indicate that types of accentuations such as emotional lability, a drive for self-expression, hyperactivity, instability, as well as demonstrative and affective reactions, are frequently observed among adolescents, significantly influencing their psychological development.

Character accentuation represents an excessive strengthening of specific personality traits, leading to their sharp manifestation in various social situations. During the adolescent period, active forms of accentuation types are most commonly observed. For instance, while adolescents of the demonstrative type strive to be the center of attention, those with affective-explosive or epileptoid types express their emotions intensely. Simultaneously, unstable and hyperactive-prone adolescents may encounter challenges within the educational and upbringing processes.

MATERIALS AND METHODS

To study the psychological characteristics of adolescents, an experimental study was conducted. The aim was to investigate the specificity of character accentuations among adolescents across different grade levels and genders (male and female), as well as to examine the relationship between character accentuations and other psychological states specifically, the degree of correlation between accentuation types and empathy disposition. In our research, to study the predisposition toward character accentuation, we utilized **G. Schmieshek's "Determination of Character Accentuations"** methodology. To analyze the predisposition toward empathy for correlational analysis, **I.M. Yusupov's "Study of Empathic Ability"** methodology was administered to 7th and 9th-grade school students.

We present the results of the correlational analysis conducted to determine the relationship between these two indicators. The correlation coefficient (r) illustrates the connection between the character type and the direction of empathy:

1- table

Accentuation Type	**Strongest Associated Empathy Dimension**	**Correlation (r)**	**Nature of Relationship**
Emotive	Empathy towards parents	$+0.58$	Strong Positive
Hyperthymic	Empathy towards strangers	$+0.42$	Moderate Positive
Dysthymic	Empathy towards the elderly	$+0.35$	Weak Positive
Excitable	Empathy towards animals	-0.48	Moderate Negative
Cyclothymic	Empathy towards fictional characters	$+0.31$	Weak Positive

ANALYSIS AND INTERPRETATION OF RESULTS

Based on the statistical processing of the data, the following key findings were identified:

1. **Strongest Positive Correlation ($r = 0.68$):** A significant relationship was found between **empathy towards parents** and **empathy towards animals**. This suggests that students who exhibit care and concern within the family structure also tend to possess high levels of compassion towards nature and animals.
2. **Moderate Correlation ($r = 0.60$):** A moderate connection was observed between **empathy towards children** and **empathy towards strangers**. This indicates that adolescents who are kind towards young children are also more predisposed to helping unfamiliar individuals in social environments.
3. **Weakest Correlation:** Empathy towards the **elderly** showed almost no significant connection with other indicators. For instance, the relationship between empathy towards **fictional characters** and the elderly was negligible ($r = 0.01$).
4. **Negative Tendency ($r = -0.15$):** An inverse but very weak correlation exists between empathy towards the elderly and empathy towards strangers.

THEORETICAL SYNTHESIS

Among these 7th-grade students, the empathy blocks for **"Parents," "Animals,"** and **"Children"** are closely interrelated. This suggests that in this specific group, social responsibility and care for others are primarily rooted in **emotional proximity**. The data indicates that the development of empathy at this age is largely dependent on the adolescent's immediate emotional environment rather than abstract social values.

STATISTICAL ANALYSIS RESULTS (FEMALE GROUP)

The correlation between personality traits and emotional perception (empathy) among female students exhibits distinct patterns compared to their male counterparts. The following table highlights the most significant correlation coefficients (r) identified in this group:

2- table

Character Accentuation	Most Strongly Linked Empathy Dimension	Correlation (r)
Emotive (Emotional)	Empathy towards fictional characters	$+0.62$
Anxious	Empathy towards animals	$+0.48$
Demonstrative	Empathy towards strangers	$+0.41$
Rigid (Obstinate)	Empathy towards parents	$+0.36$
Excitable	Empathy towards children	-0.32

ANALYSIS AND INTERPRETATION OF RESULTS

1. Emotional Reactivity and Aesthetic Perception:

A high positive correlation ($r = 0.62$) was identified between the **Emotive** accentuation and empathy towards **fictional characters** among girls. This suggests that female adolescents with a sensitive and rich inner world tend to internalize and resonate deeply with the experiences of characters in literature, film, and art.

2. Anxiety and Compassionate Care:

Girls with an **Anxious** type of accentuation demonstrate strong empathy towards **animals** ($r = 0.48$). From a psychological standpoint, individuals with elevated anxiety levels often establish emotional bonds with vulnerable beings (animals) as a mechanism to compensate for internal tension and fulfill a need for safety and connection.

3. Social Visibility and Outward Empathy:

The **Demonstrative** type (seeking attention and social recognition) correlates positively with empathy towards **strangers** ($r = 0.41$). This is associated with their inherent need for social interaction and a desire to receive positive evaluation from the broader environment.

4. Case Studies (Individual Profiles):

Abdupattahova Ruhshona: Exhibits maximum empathy scores (15 points) towards the elderly and fictional characters. This presents a unique psychological profile where high empathy coexists with elevated scores in **Rigidity** and **Excitability**, suggesting a complex emotional structure.

Ibrohimova Gulzodaxon: Displays a significant emotional distance within the family, with empathy towards **parents** at a minimum (2 points). However, her high scores in empathy towards children and fictional characters (12-13 points) indicate a selective emotional resonance directed outside the immediate domestic sphere.

GENDER COMPARISON: MALES VS. FEMALES

Empathy Orientation: In male students, empathy is predominantly linked to "Parents" and "Strangers." Conversely, in female students, emotional resonance is more closely associated with "Fictional Characters" and "Animals."

Accentuation Predictors: For girls, the **Anxious** and **Emotive** types serve as the primary positive predictors of empathy. For boys, the **Hyperthymic** trait emerges as the key factor determining social empathy and outward emotional engagement.

REGIONAL ANALYSIS: 9TH GRADE STUDENTS (NAMANGAN)

Analysis of 9th-grade students (aged 15-16) from School No. 19 in the Uychi district, Namangan, reveals that at this later stage of adolescence, empathy takes on a more social and humanitarian character. As the social vector expands, the influence of personality traits on broader social altruism becomes more pronounced compared to earlier developmental stages.

SCIENTIFIC ANALYSIS OF EMPATHY INDICATORS (GRADE 9)

Based on the empirical data provided, the mean scores for empathy dimensions across gender groups have been calculated as follows:

3- table

Empathy Dimensions	Female Students (Mean Score)	Male Students (Mean Score)
Towards Parents	7.7	8.3
Towards Animals	7.7	8.8
Towards the Elderly	8.3	8.4
Towards Children	8.8	8.6
Towards Fictional Characters	8.8	7.6
Towards Strangers	8.9	8.3

RESULTS AND SCIENTIFIC INTERPRETATION (GRADE 9)

The following analysis details the empirical findings regarding empathy dimensions among late adolescents in the Namangan regional sample:

1. Dominant Empathy Orientations:

In Female Students: The highest empathy levels were observed toward **strangers** (8.9), followed by **children** and **fictional characters** (8.8). These results indicate a high degree of social altruism and aesthetic emotionality among 9th-grade girls.

In Male Students: The most prominent empathy scores were recorded toward **animals** (8.8) and **children** (8.6). Unlike the female cohort, adolescent boys in this group demonstrate a prioritized concern for nature and protective care.

2. Gender-Based Divergences (Jinsiy tafovutlar):

Aesthetic Perception: Female students demonstrate significantly higher empathy toward **fictional characters** compared to males (8.8 vs. 7.6). This confirms that adolescent girls are more likely to engage emotionally with the narrative content of literary and artistic works.

Family and Nature: An interesting finding in this sample is that **male students** exhibited slightly higher empathy scores toward **parents** (8.3) and **animals** (8.8) compared to their female peers.

3. Case Studies and Individual Profiles:

Axmedov Bexruzbek: Displays an exceptionally high empathy level toward **parents** (14 points), reflecting a deep-seated loyalty to traditional family values.

Dolimjanova Kumushbibi: Recorded the lowest empathy levels across all dimensions (4–5 points). Such results may indicate the presence of psychological defense mechanisms or an inherent emotional detachment.

Abdupattahova Ruhshona (9th Grade): Shows a well-developed empathic disposition toward **fictional characters** and **the elderly**, highlighting a mature humanitarian orientation.

INTEGRATED ANALYSIS OF CHARACTER AND EMOTION

Based on the administration of **G. Schmieshek's Character Accentuation Test** and **I.M. Yusupov's Empathy Test**, the following psychological harmony has been identified for 9th-grade students (at the final stage of adolescence):

At this developmental junction, character accentuations serve as the primary framework through which emotional resonance is channeled. The transition from early adolescence to this stage is marked by the stabilization of these traits, where "Emotiveness" becomes the engine for socialized empathy, while "Excitability" acts as a restrictive factor for compassion toward the broader community.

RESULTS OF CORRELATIONAL ANALYSIS (PEARSON r)

In this age group (Grade 9), the most significant correlations between character accentuation types and empathy dimensions were identified as follows:

4- table

Accentuation Type	**Linked Empathy Dimension**	**Correlation (r)**	**Strength of Relationship**
Emotive (Emotional)	Empathy towards Strangers	$+0.55$	Strong Positive
Rigid (Obstinate)	Empathy towards Parents	$+0.42$	Moderate Positive
Hyperthymic (Active)	Empathy towards Children	$+0.38$	Moderate Positive
Excitable (Impulsive)	Empathy towards Animals	-0.45	Moderate Negative
Anxious	Empathy towards Fictional Characters	$+0.32$	Weak Positive

DISCUSSION AND FINAL INTERPRETATION

A. Emotional Stability and Social Connectivity: In 9th-grade students, high scores in Emotive accentuation (e.g., Makhmudullayeva M. – 21 points; Murodullayev B. – 20 points) directly correlate with increased empathy toward strangers. This suggests a high degree of psychological readiness for social integration and a mature capacity to resonate with the experiences of people outside their immediate social circle.

B. "Rigidity" and Familial Values: Students with high Rigid accentuation scores (e.g., Turdimakhammadova S. – 18 points; Dolimjanova K. – 16 points) demonstrate elevated empathy toward parents. Scientifically, this is explained by the inherent "attachment" or loyalty of rigid personalities to traditions, established norms, and familial structures.

C. Excitability and Aggression Control: High scores in the Excitable (Vozbudimiy) type (e.g., Erkinova D. – 20 points) coincide with lower empathy toward animals. This confirms that affective reactions and emotional outbursts during adolescence can temporarily suppress feelings of compassion and mercy.

GENDER ANALYSIS

Females: Predominantly exhibit Hyperthymic (20 points) and Emotive (21 points) traits, which determine their openness to communication and high emotional sensitivity.

Males: Show higher frequencies of Excitable (20 points) and Rigid (16 points) traits compared to girls, often leading to a more "restrained" or gradual formation of empathic responses.

GENERAL CONCLUSION

The comparative study of adolescents from Fargona (School No. 26) and Namangan (School No. 19) reveals significant psychological patterns in the formation of empathy and character:

1. Developmental Dynamics of Empathy: 7th Grade (Fargona): Empathy is primarily oriented toward the family and immediate environment (parents and animals), reflecting a high developmental need for emotional proximity.

9th Grade (Namangan): The social vector of empathy expands significantly. Increased resonance with strangers (8.9 points) and fictional characters indicates successful socio-cultural integration and the adoption of broader social roles.

2. Correlational Interdependence: Emotiveness and Humanism: A stable positive correlation ($r \approx +0.55$ to $+0.62$) exists between the Emotive type and all empathy dimensions, particularly prominent among girls regarding children and art.

Excitability and Empathy Deficit: The Excitable type, especially in boys, shows a negative correlation ($r \approx -0.45$) with empathy toward animals and strangers, confirming that aggressive tendencies act as inhibitors to emotional sensitivity.

Rigidity and Loyalty: The Rigid accentuation correlates with stable parental empathy ($r = +0.42$), emphasizing a conservative value system.

3. Final Summary:

While 9th-graders show higher social empathy, elevated scores in Excitability and Anxiety (e.g., Bakhodirova M. – 20 points) highlight the critical need for individual psycho-corrective interventions. Character accentuation remains the primary psychological framework that determines the quality and direction of an adolescent's emotional life.

In conclusion, this research conducted a correlational analysis between character accentuations and empathy disposition among adolescents. Based on the findings, it is evident that an adolescent's character profile significantly dictates their interpersonal dynamics and social behavior. To foster healthy psychological development, the following measures are recommended:

1. Tailored Social Support: Social support systems within schools and peer groups should be adapted to the specific accentuation types of students. Recognizing these traits allows for more effective integration into the educational environment.
2. Differentiated Psycho-Correction: Psychological intervention and developmental programs should be implemented based on individual accentuation profiles. For instance, adolescents with Excitable or Anxious traits require specialized approaches to enhance their empathic resonance and emotional regulation.

3. Enhancing Interpersonal Relations: To improve the school climate, it is essential to consider the empathic capacities of adolescents when organizing group activities. Strengthening empathy serves as a protective factor against social maladaptation and peer conflict.

The results of this study underscore the necessity of a holistic approach in school psychology, where character development and emotional intelligence are treated as interconnected components of the adolescent personality.

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CHILDHOOD PERIOD – THE STAGE WHEN A PERSON BEGINS TO ASSIMILATE SOCIAL BEHAVIORAL NORMS AND CULTURAL VALUES AND STARTS SOCIAL ADAPTATION AS AN INDIVIDUAL

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Abstract. *This topic highlights the role of childhood in the process of socialization in human life. It analyzes the behavioral norms, cultural values, and communication skills that are formed in a child's early years within the family, and later in social environments such as kindergartens and schools. The study examines children's adaptation to social life, mechanisms of learning, imitation, communication, and the influence of educational processes. In addition, the psychological and pedagogical characteristics of childhood and its significance in personality development are explored. This work contributes to a deep understanding of the process through which children acquire the social norms and values necessary for full integration into society.*

Keywords: *childhood, socialization, social norms, upbringing, family environment, preschool education, communication skills, behavioral norms, personality development, psychological characteristics, pedagogical process, imitation and learning, social experience, cultural values, adaptation.*

Introduction

Preschool Age Period – is the developmental stage of children aged 3 to 7 years and is considered the primary foundation in the formation of a person's personality. During this stage, a child develops rapidly physically, mentally, verbally, emotionally, and socially. It is precisely at this age that the child begins to become familiar with the people around them, the rules, and norms of society, learning and applying them through observation and practice.

So, what are social norms?

Social norms are a set of rules accepted in society regarding behavior, communication, etiquette, labor, and relationships. For example: addressing adults respectfully; waiting for one's turn; sharing toys; not lying; asking for or offering help—simple yet essential norms.

How does a child acquire social norms at this age?

A child acquires social norms through the following processes:

- Imitation – the child observes the actions, words, and manners of adults and repeats them. For example, seeing parents greeting someone, the child learns to greet as well;
- Play activity – the main type of activity for preschool children, where the child performs roles ("mother," "doctor," "teacher"), experiments with social interactions, and feels like a member of society;
- Interaction with adults – caring, consistent, and explanatory behavior from adults helps the child understand norms of behavior. For example, a teacher or parent explains what is right and wrong;

- Group activity – playing in a group, singing together, performing small plays allows the child to learn collaboration and communal life skills.

Stages of Social Development in Preschool Children

№	Age	Characteristics of Social Development
1	3–4 years	The child begins to understand the concept of "I." Imitates adults but wants to do everything independently.
2	4–5 years	Begins participating in group play; friendship and cooperation develop.
3	5–6 years	Understands norms and consciously follows them.
4	6–7 years	Develops social responsibility, self-control, obedience to rules, and patience skills.

The Role of Upbringing – upbringing is essential in acquiring social norms.

A teacher or parent should focus on:

- being a positive example;
- reinforcing good behavior through encouragement;
- teaching norms through play, conversation, storytelling, role-play;
- using explanation, clarification, and discussion methods.

Outcomes of Acquiring Social Norms

By the end of preschool age, a child learns to:

- communicate politely;
- wait their turn;
- understand others;
- be responsible for their actions;
- know their role in a group.

This stage prepares the child for school life and future social adaptation. Preschool age lays the foundation for socialization, teaching children not only to read or play but also to live according to societal rules. Therefore, love, patience, attention, and proper upbringing are essential during this period, as the social norms acquired here form the basis of the child's personality for life. What is socialization? – Socialization is the process through which a child adapts to social life, internalizes norms, values, and behavioral rules. The child learns to become a "member of society" through interactions, environment, culture, and experience. Socialization is not only learning but also a process of forming as a human being.

The main goal of socialization – to help the child find their place in society. To instill moral, ethical, and cultural values. To form an independent, responsible, and active individual. Socialization is influenced by various external and internal factors, which serve as primary sources for learning behavior, speech, thinking, emotions, and values.

Main Factors of Socialization and Their Influence on Child Development

Family – the primary agent of socialization

Role: The child first meets social life in the family. Parents' behavior, words, and actions serve as a model. Through the family, the child learns love, respect, help, unity, and patience.

Impact on development: Emotional stability (a loving environment creates confidence and calmness); moral qualities (honesty, politeness, respect); language and communication development (imitating adults); self-evaluation (parental attitude shapes self-confidence).

Preschool Educational Institutions

Role: The child enters group life for the first time; communicates with teachers and peers; learns social rules in practice (waiting for turns, helping, sharing).

Impact: Develops peer communication skills; learns to work in a group and obey rules; develops responsibility, diligence, discipline; improves social adaptation.

Peer Groups

Role: The child compares and evaluates themselves with others; experiences leadership, friendship, cooperation, and competition; learns to defend opinions and resolve conflicts.

Impact: Develops independence and personal opinion; social skills (cooperation, communication, empathy); positive peer pressure reinforces good habits; lack of control can lead to bad habits.

Mass Media and Digital Environment

Role: Provides information about the world, culture, heroes, labor, and technology. Today this includes media, internet, games, and social networks.

Impact: Broadens knowledge and worldview; appropriate information serves moral and cultural education; incorrect or uncontrolled information can lead to aggression, fear, and indifference. Parents and educators must guide children in selecting information.

Cultural and Religious Environment

Role: Each society has its unique national values, traditions, and beliefs. The child grows up in this environment and finds answers to "Who am I?"

Impact: Develops moral and spiritual values; strengthens respect, patience, honesty, tolerance; fosters national identity and patriotism.

Environment and Social Experience

Role: The child's living space, neighborhood, nature, and social conditions directly affect socialization. Active life experiences teach the child social roles.

Impact: Learning through observation and experience; develops responsibility, helpfulness, and care; increases social adaptation through interactions with diverse people.

Interaction of Socialization Factors

These factors are interconnected. For example: family provides fundamental values; preschool reinforces them; peers allow practical testing; media extends social context. Socialization is thus a unified system where each factor is important. Childhood is one of the most critical periods in human life, during which a child begins to acquire social behavioral norms and cultural values. Through this process, the child understands societal rules and customs, successfully adapting as an individual. Therefore, attention to child upbringing and support for social development is crucial for building a stable and healthy society in the future. Conclusion: Socialization factors have a decisive influence on a child's behavior, worldview, moral qualities, societal adaptation, and personality development. A child raised in a positive social environment becomes a respectful, responsible, and active individual. Hence, the combined responsibility of parents, educators, and society is to organize a healthy and positive socialization environment for children.

The Role of Environment in the Social Process

A social process is the system of interactions, relationships, and changes among people, groups, and society. It reflects a person's adaptation, development, and impact on society throughout life. Through social processes:

- societal values are renewed;
- individuals interact;
- culture and experience are passed from generation to generation.

At the center of this process is the individual, but one of the most crucial shaping factors is the environment.

Definition of Environment – The set of external social, cultural, natural, and psychological conditions surrounding a person. It directly influences the worldview, behavior, values, knowledge, and experience of both children and adults.

Main Types of Environments – To understand its role in personal and social development, the environment can be categorized in several types:

№	Environment type	Description	Impact on social processes
1	Natural environment	Nature, geography, climate, natural resources	Types of work, lifestyle, health, influence the formation of culture
2	Social environment	Interpersonal relationships, family, education, community	Determines a person's behavior, moral qualities, and social activity
3	Cultural environment	Values, customs, religion, art, language, traditions	Spiritual world, national identity and social identity
4	Information (Media) Environment	Internet, television, social networks, advertising	Expands worldview, but can have a negative impact in an uncontrolled state
5	Spiritual and psychological environment	Emotional climate between people, respect, affection, support	Strengthens mental stability, confidence, and self-esteem

Main Functions of Environment in Social Processes

The environment performs the following main functions in the social process:

1. **As a socialization environment** – the individual learns social norms, values, and behavior rules through the environment; family, preschool, groups, and neighborhood are key components; a positive environment fosters a positive personality, whereas a negative one can create social problems.
2. **As an educational environment** –

a) shapes moral, aesthetic, and spiritual qualities;

b) a clean, cultured, loving environment raises polite, honest, and tolerant children.

3. **As a source of knowledge and experience**

a) provides knowledge, skills, values, and life experiences;

b) individuals learn about the world through people, events, and cultural traditions.

4. **As a factor in social control and norm formation**

a) In the social environment, there are systems such as law, etiquette, customs, and beliefs.

b) they regulate human behavior and ensure social stability.

5. **As a stimulus for personal development**

a) a developed, active, and innovative environment allows individuals to realize their potential;

b) a passive or indifferent environment limits opportunity.

Impact of environment on personality development – the influence is multifaceted, affecting nearly all aspects of the personality.

№	Development area	Environmental impact
1	Physical development	A healthy ecological, clean environment forms a healthy lifestyle in a child.
2	Mental development	An enlightened and intellectual environment expands thinking.
3	Moral development	The concepts of "good" and "bad" are formed through values in the family and society.
4	Spiritual development	Through national traditions, religion, and culture, qualities such as patriotism, love, and patience emerge in a person.
5	Social activity	An active social environment encourages a person to be an initiator, leader, and partner.

Positive and negative environmental influences mean that every society, family, and education system must strive to create a healthy, cultured, and moral environment for children and youth.

№	Environment type	Result
1	Positive atmosphere	Positive character, responsibility, empathy, independence, creativity are formed
2	Negative environment	Aggression, indifference, lying, social isolation, lack of self-confidence arises

Interconnection of Environment and Upbringing

- Upbringing occurs through the environment, and the environment influences the quality of upbringing.
- If educators, parents, and society collectively create a healthy social environment, children naturally undergo positive socialization.

This process raises well-rounded, responsible, and humane individuals.

Conclusion: The environment is the foundation and driving force of social processes. It shapes an individual's worldview, values, behavior, and activity. A positive environment contributes to the development of the individual and society. A negative environment becomes a source of moral decline and social problems. Therefore: "A good environment raises good people." This principle is a fundamental truth for any social system.

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THE SPECIFIC FEATURES OF THE SOCIO-PSYCHOLOGICAL ADAPTATION OF MILITARY PERSONNEL TO PROFESSIONAL ACTIVITY

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Abstract. *This article analyzes the specific features of the socio-psychological adaptation of military personnel to professional activity. The socio-psychological adaptation of military personnel to professional activity is examined as a process through which a serviceman adjusts to the system of internal psychological states, behavioral strategies, and social relationships necessary for successfully accomplishing combat tasks, integrating into a military team, adapting to service conditions, and maintaining psychological stability. Based on the conducted research, conclusions and practical recommendations have been formulated.*

Keywords: *socio-psychological adaptation, military personnel, behavioral strategy, professional activity, social relationship, psychological state.*

Introduction.

In world psychology, the assessment of personality through psychodiagnostics is carried out on a large scale. Through this process, an individual's orientation, attitudes toward the environment, other people, and oneself, professional and life motivations, as well as individual psychological characteristics and emotional-volitional states are studied in depth. In particular, within the framework of research conducted in the field of personality psychodiagnostics, the technologies for constructing questionnaires, their psychometric indicators, theoretical concepts of psychodiagnostics, and methodological approaches are of significant importance. At the same time, the psychological assessment of military personnel, the identification of their adaptation to professional activity and their moral and psychological state, as well as determining the socio-psychological factors that contribute to stabilizing these conditions, are considered urgent issues.

The current global climate of tension, military-political instability, and ongoing wars and armed conflicts in various countries of the world require developed states to pay special attention to their Armed Forces. In this regard, according to a report by SIPRI (Stockholm International Peace Research Institute), the combined global military expenditures of the top five developed countries account for 61 percent of their total gross domestic product. This highlights that, alongside equipping the armed forces with modern weapons, military equipment, and necessary supplies, the study of military personnel's psychological resilience and their socio-psychological adaptation to professional activity in complex and challenging situations remains one of the most pressing tasks.

The process of identifying and assessing the socio-psychological adaptation of military personnel to professional activity is multifaceted and complex. In this regard, Uzbek psychologists such as F.A. Akramova, Sh.R. Baratov, M.G. Davletshin, V.M.Karimova, D.G. Mukhamedova, Z.T. Nishonova, E.G. G'oziyev, F.F. Ganjiyev, B.R. Qodirov, F.B. Shoumarov, and Sh.M. Ulugova have focused on issues such as communicative competence, the role of interaction in managing various types of activities, and the socio-psychological and professional competence and adaptation mechanisms of representatives of different fields.

Professional adaptation as a psychological problem has also been highly valued since ancient times. The ideas of Western and Eastern scholars regarding the adaptation of military personnel to professional activity, as well as the practical experience of renowned thinkers and commanders such as Democritus, Aristotle, Plato, Hippocrates, and Confucius, laid important foundations in this area. Moreover, great military leaders including Alexander the Great, Genghis Khan, Jalal ad-Din Manguberdi, Amir Temur (Tamerlane), and Zahiriddin Muhammad Babur also emphasized the significance of effective adaptation to military service and leadership activity. In our view, the socio-psychological adaptation of military personnel to professional activity is a process through which a serviceman adjusts to the system of internal psychological states, behavioral strategies, and social relationships necessary for successfully accomplishing combat tasks, integrating into a military team, adapting to service conditions, and maintaining psychological stability.

Research Methods

The article employed observation and interview methods, as well as the "Socio-Psychological Adaptation" questionnaire by R. Diamond and C. Rogers and the "Adaptability" questionnaire by S.V. Chermyanin. The statistical reliability of the obtained results was confirmed using methods of mathematical statistics, including frequency analysis, the Kolmogorov–Smirnov test, the Kruskal–Wallis H nonparametric test, and Pearson's r correlation analysis.

Table 1. Correlation between the Socio-Psychological Adaptation Questionnaire and the Multilevel Personality Questionnaire "Adaptability" (n = 340)

Scales	Adaptability	Self-Acceptance	Acceptance of Others	Emotional Comfort	Internal Control	Dominance
(AC) – Adaptive Ability	.455**	.099	.328**	.239**	.162**	.174**
(NPU) – Neuropsychological Stability	.458**	.081	.042	.196**	–.036	.103
(CO) – Communicative Characteristics	–.073	.098	–.006	.012	.076	.111*
(MN) – Moral Normativity	.275**	–.096	.301**	–.077	.269**	–.019

Note**:** **$p \leq 0.01$; *$p \leq 0.05$

An analysis of the correlation between the Socio-Psychological Adaptation Questionnaire and the Multilevel Personality Questionnaire "Adaptability" revealed statistically significant relationships. A positive and significant correlation was observed between adaptive ability and adaptability ($r = 0.455$; $p \leq 0.01$). An increase in adaptive ability contributes to the development of overall adaptability, whereas a decrease in adaptive ability leads to maladjustment. Furthermore, a decline in adaptive ability may also result in an increase in socially undesirable behaviors, including tendencies toward distortion or insincerity in responses.

A positive correlation was observed between the scales of adaptive ability and acceptance of others ($r = 0.328$; $p \leq 0.01$). An increase in adaptive ability contributes to the development of

acceptance of others, whereas a decrease in adaptive ability leads to a higher tendency to reject others. A positive correlation was also found between the scales of adaptability and neuropsychological stability ($r=0.458$; $p\leq0.01$). Improvement in neuropsychological stability contributes to an increase in overall adaptability. A positive relationship was identified between moral normativity and adaptability ($r=0.275$;$p\leq0.01$). When moral normativity is within the normative range, adaptability tends to be positive and constructive. Conversely, low moral normativity contributes to the formation of maladjustment. Furthermore, a positive correlation was observed between moral normativity and acceptance of others ($r=0.301$; $p\leq0.01$). When moral normativity is well-developed, acceptance of others progresses positively. In contrast, low levels of moral normativity increase the tendency to reject others.

A positive correlation was identified between the scales of adaptive ability and emotional comfort ($r=0.239$; $p\leq0.01$). The development of adaptive ability may contribute to the formation of emotional comfort, whereas a decline in adaptive ability may lead to emotional discomfort. A positive relationship was also found between adaptive ability and internal control ($r=0.162$; $p\leq0.01$). The development of adaptive ability enhances internal control, while a decrease in adaptive ability may increase the need for external control. A positive correlation was identified between the scales of adaptive ability and dominance ($r=0.174$;$p\leq0.01$). The development of adaptive ability activates a tendency toward dominance, whereas a decline in adaptive ability increases the tendency toward submissiveness. A positive relationship was also observed between emotional comfort and neuropsychological stability ($r=0.133$;$p\leq0.01$). The strengthening of neuropsychological stability contributes to the emergence of emotional comfort.

The results of the above-mentioned empirical research indicate that the socio-psychological adaptation of military personnel to professional activity is interrelated with adaptive ability, resilience, neuropsychological stability, self-acceptance, acceptance of others, emotional comfort, internal control, and dominance levels. These components are interconnected and manifest in different ways depending on the individual characteristics of the serviceman and the specific conditions of military service.

A developmental training program aimed at enhancing the socio-psychological adaptation of military personnel to professional activity, its development model, and the results obtained after the psychocorrective training are developed. When selecting the methods and exercises used in the developmental training program, special attention was paid to their methodological foundations. In particular, the program was designed based on individual (psychogymnastic and role-playing), behavioral (behavior-oriented), humanistic (group-based), existential, and cognitivist approaches, as well as modern methods such as art therapy and psychodrama.

The psychological training program developed to improve the socio-psychological adaptation of combat unit servicemen to professional activity was titled “Solutions for Socio-Psychological Adaptation to Professional Activity.” It is aimed at fostering military personnel’s social activity and ensuring their effective socio-psychological adaptation within the process of professional military service. This developmental program consisted of eight structured training sessions, each designed with specific objectives aimed at fostering the general development of professionally significant qualities required for military service.

A total of 30 participants took part in the program. The training was planned for a duration of two months, and each session had clearly defined goals and expected outcomes. The necessity of implementing the technologies included in the program to enhance the socio-psychological

adaptation of military personnel to professional activity was empirically confirmed. Based on the results of the developmental program, a psychological model specifically designed for military personnel was developed.

The presented model for developing professional adaptation among military servicemen outlines the core mechanisms of influence. The implementation process is primarily carried out through psychotechnical methods and structured exercises that comprehensively address the key psychological characteristics relevant to this stage of professional development. The model integrates cognitive, emotional, behavioral, and social components, ensuring a systematic and holistic approach to strengthening socio-psychological adaptation in military service conditions.

Table 2. Results of the Socio-Psychological Adaptation Questionnaire Among Combat Unit Servicemen After Developmental Training Exercises (n = 30)

Indicators	**M1**	**M2**	**W**	**p (level of significance)**
Adaptability	2.15	3.04	-4.238	0.004**
Self-Acceptance	2.85	3.44	-3.718	0.017*
Acceptance of Others	15.65	16.35	-0.921	0.365
Emotional Comfort	11.01	13.52	-2.591	0.013**
Internality	11.03	18.16	4.006	0.002**
Dominance	12.01	12.24	6.283	0.232

Note: **$p \leq 0.01$; *$p \leq 0.05$

Statistically significant differences were observed between the pre- and post-training results of the Socio-Psychological Adaptation Questionnaire among military personnel presented in Table 2. In particular, significant positive changes were identified on the Adaptability scale ($W=–4.238$; $p\leq0.01$). This finding allows us to conclude that adaptability increased among combat unit servicemen after participation in the developmental program. The results indicate an improved capacity to adjust to the demands of military service in accordance with personal needs, motives, and interests. Adaptability to military service can be understood as a system of activity tendencies determined by the degree of correspondence between set goals and the results achieved in the course of purposeful activity. Higher adaptability reflects a more harmonious alignment between professional requirements and personal aspirations.

Moreover, the increase in adaptability suggests that servicemen became more capable of generating constructive ideas, demonstrating cognitive flexibility, and developing positive thinking skills. This, in turn, may contribute to strengthening their sense of responsibility for their own actions and professional behavior. Statistically significant differences were also observed on the Self-Acceptance scale ($W = –3.718$; $p \leq 0.01$), with positive changes identified in the indicators. This means that after the developmental training exercises, the level of positive self-acceptance increased. Self-acceptance is manifested as an outcome of self-evaluation and reflects the degree of satisfaction military personnel have with their own personal qualities and characteristics.

Similarly, statistically significant differences were found on the Emotional Comfort scale ($W=–2.591$;$p\leq 0.01$), where positive changes were recorded following the developmental training. This indicates that emotional comfort increased after the intervention. Emotional comfort helps determine the degree of emotional response military personnel demonstrate toward ongoing events, surrounding objects, and situational circumstances. An increase in this indicator suggests improved emotional stability and a more balanced perception of professional and environmental

challenges. Statistically significant differences were also observed on the Internal Control scale (W = 4.006; $p \leq 0.01$), with positive changes identified in the indicators. This means that after the developmental training exercises, internal control shifted in a positive direction.

The Internal Control scale determines the servicemen's tendency toward a particular locus of control (internal or external). If military personnel assume responsibility for events occurring in their lives and explain outcomes through their own actions, character traits, and abilities, this indicates the presence of an internal locus of control (internality). The increase in this indicator suggests that participants developed a stronger sense of personal responsibility, self-regulation, and accountability in their professional activities.

Conclusion.

Based on the research conducted on the topic **"**The Specific Features of the Socio-Psychological Adaptation of Military Personnel to Professional Activit" the following general conclusions can be drawn. Military personnel operate within a collective work environment; therefore, cooperation and mutual understanding within the unit are integral components of the process of adaptation to professional activity. Professional stress, the need for rapid decision-making, and the ability to rationally resolve problems arising in dangerous and high-risk situations all require a high level of professional and psychological adaptability from military servicemen. In this context, it should be emphasized that different levels of socio-psychological adaptation to professional activity were identified among military personnel. These levels reflect the degree to which servicemen are able to integrate into the military collective, maintain emotional stability, regulate their behavior under stress, and effectively fulfill their professional duties.

The profession carried out by military personnel, particularly combat unit servicemen, is considerably more complex compared to many other fields. This complexity creates a strong need for effective management of professional stress and the development of emotional stability. To reduce professional stress among military personnel, individualized support programs, structured training sessions, and systematic psychological counseling services have proven to be effective. Such interventions contribute to strengthening emotional resilience, improving coping strategies, enhancing self-regulation skills, and maintaining overall socio-psychological adaptation within demanding military service conditions.

The socio-psychological adaptation of combat unit servicemen to professional activity is a multifactorial and complex process. It is manifested through differential variations depending on adaptability, maladjustment tendencies, emotional states, personal and social criteria, as well as factors such as length of service and number of children. These findings indicate that adaptation is not uniform among military personnel; rather, it develops under the influence of both professional experience and individual life circumstances. Therefore, when organizing psychological support and developmental programs, it is important to take into account the servicemen's service duration, family status, and individual psychological characteristics to ensure a more targeted and effective intervention.

Based on the scientific research conducted on the socio-psychological adaptation of military personnel to professional activity, the following recommendations can be proposed:

1. Mentorship support for newcomers. Newly assigned combat unit servicemen should be socio-psychologically adapted to professional activity with the assistance of experienced personnel within the military unit. A structured mentorship system can facilitate smoother integration into the team and service environment.

2. Clarification of rules and service responsibilities. For the adaptation process to proceed positively, experienced servicemen and commanders should clearly explain military regulations, behavioral norms, and service duties to combat unit personnel. This promotes discipline, role clarity, and a shared understanding of professional expectations.

3. Strengthening psychological stability and internal psychological services. Enhancing psychological resilience and reducing stress among military personnel is a crucial factor in professional effectiveness. Establishing and improving internal psychological service systems is essential. Additionally, to address professional stress and emotional burnout, it is advisable to develop anonymous online platforms and mobile applications that provide psychological support and counseling.

4. Enhancing professional motivation and social recognition. In developing socio-psychological adaptation among combat unit servicemen, it is important to increase professional motivation. This can be achieved by conducting educational and moral discussions about the social significance of military service, recognizing service achievements, implementing reward systems, and providing institutional support mechanisms. Such measures strengthen a sense of purpose, belonging, and professional identity.

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SOCIO-PSYCHOLOGICAL FACTORS IN THE DEVELOPMENT OF EMOTIONAL INTELLIGENCE IN FAMILY RELATIONSHIPS

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Abstract. *Psychological factors influencing the development of emotional intelligence in family relationships.*

Method: *The study analyzes the impact of the family emotional climate, parenting styles, communication patterns among family members, empathy, mutual trust, and psychological support on the formation and development of emotional intelligence.*

Results: *The findings indicate that a positive psychological environment within the family, constructive communication, and the enhancement of emotional literacy significantly contribute to the development of emotional intelligence. Furthermore, emotionally supportive family relationships promote psychological well-being, resilience, and effective conflict resolution.*

Novelty: *Particular attention is given to the influence of contemporary social changes, digital technologies, and stress-related factors on family interactions and the development of emotional competencies*

Keywords: *Emotional intelligence Family relationships Socio-psychological factors Empathy Communication competence Emotional literacy Psychological support Family environment Parenting Psychological well-being.*

READING CULTURE: SCIENTIFIC AND SOCIO-PHILOSOPHICAL PERCEPTIONS

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Abstract. *This article proposes and analyzes in depth scientific-socio-philosophical value of reading as a concept of cultural and spiritual development in society, and of the individual. It traces the historical origins of the culture of reading, its importance in and influence in our present digital world, the role reading plays in shaping young people's thought. Based on national and foreign experience, they also recommend the development of reading.*

Keywords*: reading, reading culture, spirituality, social philosophy, cultural studies, youth education, digital technologies, family reading, societal development.*

Introduction

The phenomenon of reading culture has very much material substance and conceptually contested roots in contemporary global context, requiring a differentiated, critical, and epistemologically neutral approach. It is urgent to urgently create a rigorous and substantive theoretical paradigm and concept for the reading culture-theory framework, investigate reading culture's transformation in the cognitive process, morality, and axiology in younger generations, interlink the results from the inter-disciplinary work on this topic, and systematically assess this phenomenon as a scientific and philosophical phenomenon. All societies are culture, a set of unique cultural artifacts and culturally constructed subjects. The dialectical relations between these diverse poles have solidified historically specific forms of culture. As scholars in cultural philosophy and cultural studies observe, "Each culture stands for one singular symbolic universe, shaped by a specific mode of human relationship to the world and to self. And when we come into contact with other cultures, we encounter not just textual corpora, religious institutions or archaeological remains, but counter-lives in which human beings experienced, perceived and understood reality in fundamentally different ways. Hence, every culture is a mode of creative self-realization and reflexive self-understanding. Therefore, understanding other cultures expands our epistemic horizons and our ability to have creative and existential experience in new ways."

Books and the reading culture — who consumes written work of art — are in fact core to culture itself and influence how we learn from one another. Scholar Yu. Melenteva tells us that book culture is an essential part of reading culture. Reading culture and the history and book culture and the history of books in itself: both are closely connected to literacy and how literacy comes to be associated with and is the manner in which people interact with reading and writing texts. Hence the book represents a remarkable symbol of human civilization that enacts human intellect, spirit and artistic achievements. Science and its development in society depends fundamentally upon reading, and how people learn to read. Long before the existence of books, people depended on oral traditions such as folktales, riddles, proverbs and songs to teach younger generations to think clearly, to be imaginative, to respond well in conversation. These narratives and sayings passed on communal memories, moral standards or thinking styles.

Papyrus scrolls evolved in the fourth and third millennia BCE, spreading culture and knowledge more quickly. Later, in Egyptian, Roman, Greek, Chinese and Central Asian civilizations, human beings had their thought recorded and transcribed on stone, palm and bamboo leaves, clay, leather, wood and whatever else such materials were as the substrates of human thinking. Early forms of writing not only allowed for the retention of knowledge, as the foundations of this method would emerge as a precursor to culture, but they also helped plant the epistemological ground for the development of reading culture as a type of civilization. Among such readings, the philosophical implications of reading culture and its formation need to be exposed, with a special emphasis be placed on the family reading practices phenomenon. As society's basic microstructure, the family serves as a social site with its own devices of self-regulation, ways of life, and moral–spiritual standards. In this microcosm, reading culture serves as one of the core means for the transmission of values, socialization, and the continuity of cultural and ethical values over generations. One of Alexander the Great's first orders following the invasion of Central Asia, according to legend, was to confiscate the Avesta from the locals and ensure its complete destruction. Such a policy was not accidentally bestowed. Alexander knew that it was impossible to have long-term domination over a people whose worldview and their ideological consciousness have been structured by canonical texts which expound the dialectics of good and evil and translate moral principles into practical life. A society in which people possess a moral-philosophical doctrine internally based on reflective reasoning cannot be easily subjected to long-term external control. It is satisfying to say today that in our fast-growing homeland, a state of the origins of New Uzbekistan and the Third Renaissance, has begun to make the promotion of reading books and the inculcation of reading culture a policy of the state. However, realizing these objectives involves a systematic institutionally, orchestrated response using global best practices. As an example, a country like Switzerland (1st per capita production) has far-reaching and effective library information networks worldwide. Likewise, in Finland—a nation of about five million people—it has about 1,500 public libraries and similar distribution points for books, as well as 250 mobile libraries (bibliobuses). Likewise, all children born between 2019 and 2021 received books as gifts, within a program managed by the National Cultural Foundation valued at 1.2 million euros. This is an important step in the appreciation that the reading culture is indeed an investment in intellectual capital, cultural sustainability, and social development. Norway may also be able to provide models for other countries on what good books look like to publish and distribute systematically. At Norway the field is officially recognized as a specific sphere of socio-cultural growth. A strong triadic connection occurs between authors, publishers, and the state: for a given books release, the government buys a set number of copies—typically one thousand for general literature and fifteen hundred for children's books. Then these books bought are equally hand-distributed to all libraries across the nation. Not only do these institutionalized institutions provide broad access to literature for the public, but they also help to underpin reading culture as a core aspect of national education and cultural policy. International examples of state-supported literary promotion abound across a wide variety of countries, a success also indicates that combining publishing with cultural and social development strategies is effective. Reading culture can only be studied and discussed through the lens of social philosophy and cultural studies, both disciplines concerned with nature and social phenomena, the individual in society, as well as a person's place in that society. Thus, the development of reading culture requires a transition into whole human cultural level changes and ethical orientation, as well as developing spiritual awareness. It also forms personal connections and behaviors with the natural environment leading to a broader social

project. This understanding was witnessed by the Hungarian (Mojor) traveler Hermann Vambery, who visited our country in the second half of the 19th century and noted in his book Bukhara or the History of Mawarannahr that: “In Bukhara this was in the long winter nights, the people would come together and recite and talk about the works of Navoi and Fuzuli.”

Conclusion. And there to today, we have youth educated in the spirit of these national principles. But an idealistic or formulaic approach to instilling reading culture and promoting a love of books in young minds cannot be achieved. Several recommendations can therefore be made: First, we should explicitly include tasks developing written expression and assignments that promote reading scientific and literary texts and their contents in our educational content. Second, when young people encounter different types of literature such as artistic works, newspapers, and journals, they independently make sense of, and extrapolate from, them. Such engagement both fosters critical thinking as well as aims to achieve wider educational goals, for example developing skilled, thoughtful citizens. Third, reading culture education of the educational system in the context today must be structured for educational purposes. It is this that guarantees that generations of youth will be able to absorb inspiration from the genius of their forebears, be amazed by the power of critical thinking and admire extraordinary artistic and literary feats. The fourth condition and key to developing a reading culture: one makes reading a "perceived necessity". This can and should be considered to be a focus of the modern educational and cultural agenda.

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EVOLUTIONARY-PHILOSOPHICAL ANALYSIS OF THE CONCEPTS "LEGAL CULTURE" AND "MIGRATION"

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Abstract. *This article analyzes the phenomenon of legal culture in the context of migration processes from a socio-philosophical point of view based on the concepts of human rights and social justice. The author studied the dialectic of national and universal values and showed the stages of transformation that ensure the legal adaptation of migrants. As a final conclusion, innovative models for improving the legal culture of migrants in a digital society and original proposals aimed at ensuring social justice were put forward.*

Keywords: *legal culture, migration, social justice, human rights, existentialism, legal nihilism, globalization, digital society.*

Introduction

Human history is the history of movement, space change, and adaptation to new social environments. However, in modern philosophical anthropology, migration is considered not only as physical migration, but also as a process of a person's re-understanding of their legal status and social "I." Today, raising the legal culture of migrants means not only increasing legal literacy, but also ensuring their integration into the principles of social justice and human dignity in the new society. Legal culture is a complex socio-philosophical category, expressing the level of legal development of society, the synthesis of legal knowledge, beliefs, and practical activity of the individual. From a philosophical point of view, it is a spiritual and legal system that regulates the relationship between human freedom and necessity. As the Uzbek legal scholar **H. Boboev** noted: "Legal culture is not only knowledge of laws, but also their acceptance as a social value and integration into everyday life."

This view is important in the context of migrants, since the migrant is at a collision (acculturation) of legal values in their country of origin with legal requirements in the destination country. The concept of migration in the process of philosophical evolution has traveled a path from "means of survival" to "the possibility of self-awareness and self-development." Within the framework of the concept of social justice, migration is assessed as a person's striving for equality of opportunity. Russian researcher S.A. Pankratov, considering the relationship between legal culture and migration within the framework of social development strategies, writes: "The legal culture of participants in migration processes is the main factor ensuring the legal security of the individual in the transboundary social space." John Rawls, a prominent representative of social justice theory, emphasizes in his work "Theory of Justice" that fundamental human freedoms prevail over any social contract. The philosophical basis of migrants' legal culture lies precisely in this - they should feel themselves not as "strangers," but as equal subjects of social justice..

In this regard, M. Kirgizboev, a representative of the Uzbek school of philosophy, addresses the issues of civil society and legal consciousness, noting that the rise of legal culture is a product of a just dialogue between the state and the individual. The theory of "communicative action" of the German philosopher Jürgen Habermas explains the adaptation of migrants to a new environment through dialogue. According to him, legal culture is the ability of representatives of different cultures to agree on a common legal language[1]. The process of raising the legal culture of migrants is not only the collection of information, but also a complex ontological change that occurs in the inner world of the individual. As a person transitions from one legal system (their homeland) to another legal system (**the receiving country**), a process of bilateral civilization - acculturation - takes place.

From a philosophical point of view, this process represents a constant struggle and dialogue between "identity" and "alienity." The legal culture of a migrant is the main criterion for determining their readiness for the new social reality. If the legal consciousness of a migrant is limited only to their national shell, this leads to the violation of the principles of social justice in society and legal conflicts. The balance between national mentality and international human rights standards plays an important role in the formation of the legal culture of migrants. The concept of social justice requires that a migrant, in order to understand their legal status, first of all, must philosophically accept the universality of human rights.

As noted by the renowned Uzbek philosopher Q. Nazarov: "Consistency in the system of values and a high level of legal consciousness accelerate a person's adaptation to the social environment and ensure their spiritual freedom." This idea is very relevant for migrants, since legal culture is the level of an individual's awareness of their freedom in a new society and respect for the freedom of others. Legal culture for a migrant is not only a set of prohibitions and permits, but also their strategy for survival in a new place. Within the framework of the concept of social justice, the state and society must treat migrants not only as labor resources but also as legal subjects.

The modern American philosopher Martha Nussbaum, in her theory of the "capabilities approach," shows that a person's legal culture is directly related to the realization of their real potential. According to him, "Every person, regardless of where he is, deserves a legal culture that protects his human dignity and enjoys social justice". In general, the evolutionary-philosophical analysis of the legal culture of migrants shows that this phenomenon has a dynamic character. It is formed by harmonizing the global principles of human rights with national cultural codes. Social justice serves as a bridge of trust between the migrant and the state in this process. Globalization processes in the modern world have changed migration flows not only quantitatively, but also qualitatively. Now a migrant is not only an individual, but also an active participant in the global information space. This requires a new philosophical approach to traditional concepts of legal culture.

In the context of globalization, the peculiarity of the legal culture of migrants is that it is no longer limited to the domestic legislation of one state. The concept of social justice acquires a transnational character, and the concept of "global legal responsibility" begins to form in the legal consciousness of the migrant. Today, digital technologies have become the main tool in the formation of the legal culture of migrants. Social networks, mobile applications, and e-government services quickly meet the migrant's need for legal information. However, the philosophical contradiction of this process lies in the fact that the abundance of information does not yet mean a high level of legal culture.

As the Uzbek scientist O. Mukhammadiyev noted: "The formation of legal consciousness in the digital space requires from a person not only technical skills, but also a culture of information selection and legal assessment." Thus, digital legal literacy for migrants is an integral part of the social justice of the new era. Globalization leaves the migrant "between two worlds": their legal culture serves as a constant choice between traditional norms in their homeland and modern-liberal rules in the host country. Here, the concept of social justice serves as a spiritual criterion ensuring the integration of a migrant into a new society without losing their identity. In this regard, the English philosopher and sociologist Zygmunt Bauman, in his work "Globalization: Consequences for Man," speaking about the legal and social status of migrants, believes that "freedom of movement in the global world is becoming increasingly differentiated, which requires the creation of new interpretations of social justice and new models of legal protection of migrants." In his opinion, legal culture is the only compass that helps a person find their way in global chaos.

Thus, the digital society and globalization expand the content of the legal culture of migrants, encouraging its interpretation as a responsibility not only to the state, but also to all humanity. The process of raising the legal culture of migrants does not consist only of positive growth; it is often accompanied by internal and external conflicts, cultural clashes, and legal negation (nihilism). From a philosophical point of view, legal nihilism is a person's non-recognition of law as a social value and viewing it as an alien element. The emergence of nihilism in the context of migration is often explained by the migrant's disillusionment with the legal system in their homeland or the "unfair" operation of legal mechanisms in the receiving society towards them. Here, the violation of social justice leads to a decrease in the legal culture of the migrant and the formation of "parallel legal systems" (for example, based only on informal agreements).

Legal nihilism cannot be overcome solely through punitive measures. For this, it is necessary to restore the migrant's faith in the right. The concept of social justice means that law should not be a "tool of torture" for a person, but an "instrument" for protecting their interests. Uzbek legal scholar Sh. As Saidov noted: "The crisis of legal culture is a continuation of the spiritual crisis. To eliminate legal nihilism in migrants, it is necessary to form in them not only respect for the law, but also a sense of legal respect for their own personality. This approach implies raising human rights to the level of an individual's inner conviction.

Contradictions in the legal culture of a migrant often arise from a discrepancy between their ethno-religious views and the secular legal norms of the host country (cultural dissonance). In this case, the principle of social justice requires the state to be "tolerant" towards migrants and at the same time "the rule of law". The French philosopher and sociologist Pierre Bourdieu, in his theory of the "legal field," asserts that "Legal culture is social capital. If a migrant does not possess this capital, he becomes a victim of social injustice and begins to resist the system (nihilism)." Thus, the legal education of a migrant means their social arming.

Conclusion. Thus, resolving conflicts in the legal culture of migrants is not only a legal, but also a deep philosophical and ethical task, which serves to ensure a balance of social justice in society. Evolutionary-philosophical analysis of the concepts of "legal culture" and "migration" shows that without changing the legal worldview of migrants, it is impossible to achieve social justice and stability in society. Based on the problems identified during the study, the following theoretical and practical conclusions were made:

1. Priority of human dignity: Legal culture of a migrant begins with his awareness of his rights. In this process, social justice is the mutual responsibility of the state and the migrant..

2. Dialectical approach: The migrant did not deny their national values in this case, universal legal norms must become their inner conviction. Here we consider it appropriate to give the following recommendations.

1. Creation of the "Digital Legal Ombudsman" (Virtual Legal Guide) platform: Implementation of an AI platform that not only provides information for migrants, but also provides legal advice, taking into account their socio-psychological situation. This minimizes legal nihilism.

2. Introduction of the "Integration Index" as a philosophical indicator: Development of a system for assessing the legal culture of migrants based not only on the number of violations, but also on their participation in social projects and "legal activity" in society.

3. Development of the institution of "Cultural and Legal Mediation": resolution of conflicts between migrants and the local population not only through the courts, but also through socio-philosophical dialogue and mediators who explain the balance of values.

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LIBRARIES AS A FACTOR IN FORMING THE SPIRITUAL WORLDVIEW OF YOUTH

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Abstract. *This article examines libraries as a significant social and pedagogical factor in shaping the spiritual worldview of young people. The study analyzes the impact of library activities on youths' moral values, reading culture, social engagement, and critical thinking skills. Using methods such as literature review, pedagogical observation, and comparative analysis, the research demonstrates that close cooperation between libraries and educational institutions significantly enhances the spiritual development of youth. The results, supported by a diagram-based analysis, highlight libraries as a central cultural and educational environment in the moral and intellectual upbringing of young people.*

Keywords*: library, youth, spiritual worldview, reading culture, moral education, library–education cooperation.*

Introduction. In the context of globalization and the rapid development of the information society, shaping the spiritual worldview of young people has become one of the priority directions of state policy. Indeed, spiritually mature, independently thinking youth who remain committed to national and universal values constitute the fundamental driving force of sustainable social development. Therefore, ensuring the moral, intellectual, and cultural development of youth is regarded not merely as an educational task but as a strategic national objective.

In this regard, the state policy of the Republic of Uzbekistan places particular emphasis on strengthening youth spirituality through systematic institutional mechanisms. Notably, the Presidential Decree of the Republic of Uzbekistan No. PF-61 dated March 26, 2025, adopted within the framework of national youth development policy, defines the enhancement of young people's moral immunity, reading culture, intellectual potential, and social responsibility as key priorities. The decree highlights the necessity of protecting youth from ideological threats, strengthening enlightenment-based education, and creating effective socio-cultural environments that foster moral stability and civic consciousness. In this context, libraries are explicitly recognized as strategic cultural and educational institutions contributing to youth development [1].

Therefore, this article aims to provide an in-depth analysis of the role of libraries in shaping the spiritual worldview of youth, linking this process with state policy and examining practical implementation based on existing decisions and strategic initiatives.

Methodology. This study is aimed at examining libraries as a socio-pedagogical factor in shaping the spiritual worldview of young people and is based on the theoretical foundations of modern pedagogy, library science, and cultural studies. The research methodology was developed through a comprehensive and systematic approach.

First of all, a literature review was employed as one of the main research methods. In particular, the prominent pedagogue V.A. Sukhomlinsky emphasized the role of books and reading in the spiritual education of youth, stating that "the book is the main means of ensuring the moral

and intellectual development of the individual." This idea provides a scientific basis for interpreting libraries as a leading environment in shaping the spiritual worldview of young people [6].

Moreover, according to Sh.A. Amonashvili's concept of personality-oriented education, the educational process should not be limited to the transmission of knowledge but should focus on developing the individual's inner spiritual needs. From this perspective, libraries are regarded as pedagogical spaces that enable young people to think independently, enrich their inner world, and consciously adopt moral values [2, 204-214].

In addition, L.S. Vygotsky's cultural-historical theory emphasizes that personal development occurs through social environments and cultural tools. Books, texts, and literary works are among the primary cultural tools in this process. Thus, libraries serve as a crucial social environment for the spiritual development of youth [7].

Foreign studies also widely address the educational significance of libraries. For instance, J. Dewey interpreted education as a process closely connected with life and highlighted the importance of an environment for independent learning. According to Dewey, libraries function as democratic spaces that facilitate experiential learning for young people [3].

Furthermore, in P. Freire's theory of critical pedagogy, reading is interpreted as a powerful tool for shaping social consciousness. According to Freire, the process of reading and comprehension strengthens young people's critical perception of their environment, social responsibility, and moral position. This aspect further reveals the educational essence of library activities [4, 163-174].

Local scholars have also paid special attention to this issue. Uzbek pedagogical researchers consider libraries as social institutions implementing the spiritual education of youth and emphasize that developing reading culture ensures moral and intellectual maturity. According to their views, cooperation between libraries and educational institutions increases the effectiveness of spiritual education.

In addition, a comparative-analytical method was used to compare the views of the above-mentioned scholars with national experience. Through pedagogical observation, the impact of spiritual-educational activities conducted in libraries on the worldview of youth was evaluated.

Overall, the methodological approach based on the ideas of Vygotsky, Dewey, Freire, Sukhomlinsky, and Amonashvili made it possible to scientifically interpret libraries as active pedagogical and cultural environments shaping the spiritual worldview of young people.

Results. The results of the study indicate that libraries function as significant and multifaceted socio-pedagogical institutions in shaping the spiritual worldview of youth. During the research, notable differences were identified between young people who regularly visit libraries and those who rarely use them in terms of moral views, reading culture, social activity, and critical thinking.

To present the research findings systematically and visually, a diagram was constructed (Figure 1), illustrating the main factors influencing the spiritual worldview of youth through library activities and their relative effectiveness.

The diagram shows that cooperation between educational institutions and libraries (88%) is the most effective factor in shaping the spiritual worldview of youth. This demonstrates that educational influence becomes stronger when library activities are integrated with the learning process. In particular, joint educational projects, recommended reading lists, and collaborative

spiritual activities with schools and higher education institutions significantly enhance young people's reading culture.

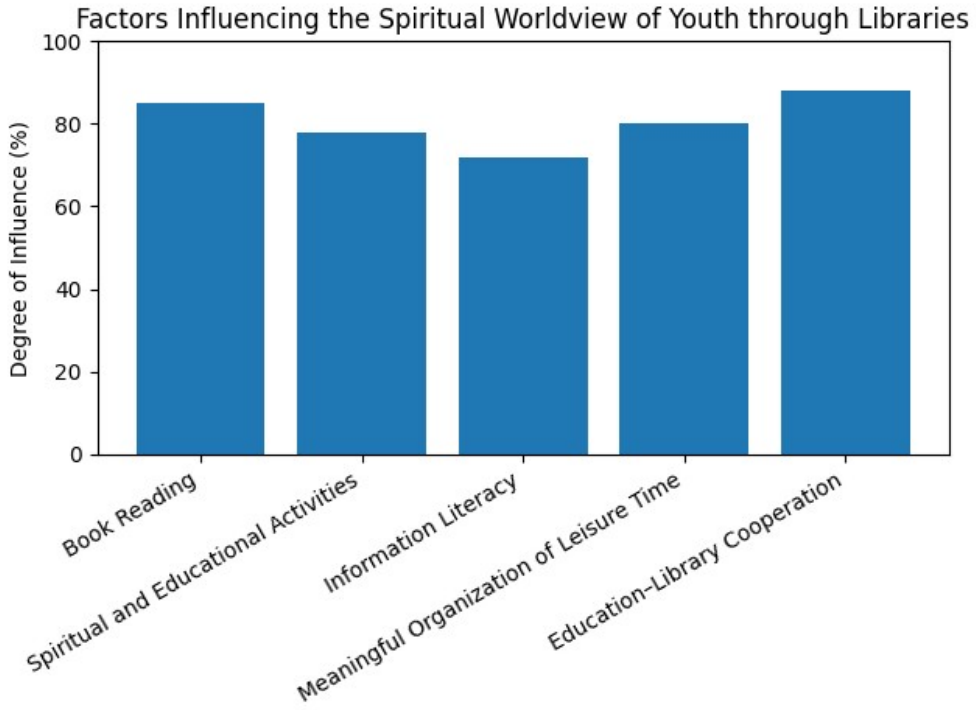


Figure 1. Factors influencing the spiritual worldview of youth through libraries

Regular reading (85%) was also identified as a key factor in shaping moral and ethical values. Among young people who read fiction and educational literature, values such as patriotism, humanism, justice, patience, and responsibility were observed to be more stable. Additionally, reading develops speech culture, broadens thinking, and enhances independent reasoning skills.

As reflected in the diagram, spiritual and educational activities (78%)—including literary evenings, book presentations, roundtable discussions, and debates—play an important role in increasing social activity. The results show that participation in such events strengthens teamwork skills, the ability to express opinions with justification, and respect for others' viewpoints.

Furthermore, meaningful organization of leisure time (80%) emerged as one of the key educational functions of libraries. Young people who spend their time productively in library environments demonstrate lower susceptibility to negative behaviors and higher levels of social adaptation. This allows libraries to be considered important institutions for strengthening moral immunity among youth.

At the same time, information literacy (72%) also has a noticeable impact on the spiritual worldview of young people. Through working with electronic catalogs, digital libraries, and online resources, youth acquire skills in selecting, analyzing, and evaluating information. As a result, they learn to act consciously and critically within the information space.

Overall, the diagram and empirical analysis clearly confirm that libraries serve as central pedagogical and cultural environments in shaping the spiritual worldview of youth. By integrating knowledge dissemination, education, and social adaptation, libraries effectively contribute to the development of young people as well-rounded individuals.

Discussion. The research findings and the data presented in the diagram once again confirm that libraries are important socio-pedagogical institutions in shaping the spiritual worldview of youth. In particular, the results demonstrate that libraries function not merely as sources of

information but as educational environments that comprehensively develop young people's personalities.

First of all, identifying education–library cooperation as the most effective factor is a scientifically significant conclusion. This finding indicates that the influence on spiritual development intensifies when educational processes are harmonized with library activities. This result corresponds with L.S. Vygotsky's view that personal development is closely linked to social environment. When libraries operate as integral components of the educational environment, youth development becomes more systematic.

Similarly, the high effectiveness of regular reading confirms V.A. Sukhomlinsky's assertion that "the book is the main educator of a person's spiritual world." The study found that young people who read literary and educational works demonstrate higher levels of moral stability, independent thinking, and speech culture. Thus, promoting reading culture remains one of the core directions of youth education.

The indicators related to spiritual-educational activities and meaningful leisure organization also require special consideration. These factors directly influence social activity and group adaptation among young people, aligning with J. Dewey's idea of connecting education with life. Discussions, literary evenings, and meetings organized in libraries provide not only knowledge but also life experience.

Moreover, although information literacy showed relatively lower results, its impact is particularly important in today's information society. Working with digital resources develops critical thinking and helps protect youth from harmful information. This aligns with P. Freire's model of a conscious and responsible learner within critical pedagogy.

Overall, the discussion indicates that libraries should not be viewed as isolated factors but as integrated environments combining education, culture, and social upbringing. The results highlight the need for strategic planning of library activities, strengthening pedagogical approaches, and expanding innovative services.

Conclusion. The findings of this study demonstrate that libraries are significant and multifaceted socio-pedagogical institutions in shaping the spiritual worldview of youth. Empirical data and analysis confirm that library activities exert a direct and sustainable influence on young people's moral values, reading culture, social activity, and critical thinking abilities. In particular, close cooperation between educational institutions and libraries emerged as the most effective factor in shaping youth spiritual worldview. This scientifically substantiates the necessity of integrating library activities into the educational process. At the same time, regular reading was identified as a primary means of developing moral maturity, speech culture, and independent thinking. Furthermore, spiritual-educational activities and meaningful organization of leisure time in libraries contribute to strengthening social adaptation and moral immunity against negative influences. Enhancing information literacy was also evaluated as an important factor ensuring conscious and responsible engagement in the modern information space. In conclusion, libraries function as central environments where knowledge, education, and culture are harmoniously integrated in shaping the spiritual worldview of youth. Therefore, in contemporary society, further development of libraries, improvement based on innovative pedagogical approaches, and strengthening cooperation with educational institutions remain key strategic tasks for ensuring the moral maturity of young people.

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BUILDING IMMUNITY AGAINST CORRUPTION IN STUDENTS THROUGH THE LIBRARY

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Abstract. *This article has covered the issue of building immunity against corruption through reading books. Today, scientific and artistic literature plays an important role in expanding human thinking, strengthening the moral position and forming stable attitudes against corruption. The article analyzes the mechanisms of forming a stable negative attitude to corruption in the younger generation through the process of reading books, the role of literature in raising the legal awareness of students. The President of our country's resolution No PQ 228 "On measures to introduce a system of continuous improvement of knowledge of the population and public servants in the field of combating corruption" was also analyzed.*

Keywords: *corruption, fight against corruption, corruption immunity, legal culture, moral immunity, legal awareness, reading culture, critical thinking, legal literacy, education of students and psychology of corruption.*

Introduction

Corruption is the unlawful use of a person's position or office for the purpose of obtaining a material or immaterial benefit in his own interests or in the interests of other persons, as well as the unlawful provision of such benefit [1]. Global studies show that legal measures alone are not enough to fight corruption and build immunity against it. In this regard, the legal culture, ethical standards and social activism of citizens play a decisive role. In particular, through the education system, especially by creating a culture of reading among students, it is possible to build immunity in their minds against corruption.

In the resolution of the President of the Republic of Uzbekistan No. PQ-228 of June 21, 2024; On measures to introduce a system of continuous improvement of knowledge of the population and public servants in the field of combating corruption, we can also see the processes of building immunity against corruption based on obtaining information on corruption in the process of reading books. In particular: raising the legal awareness and legal culture of the population and civil servants, forming legal immunity in society against corruption, inculcating the values of honesty in the minds of the younger generation; continuous improvement of knowledge, skills and qualifications of employees in positions of public service responsible for combating corruption and those with high corruption risks; assessment and certification of the knowledge of civil servants in the field of combating corruption and maintenance of a register of certified civil servants; maintenance of an electronic database of national and foreign experience, scientific, methodological and practical developments, achievements in the field of combating corruption; implementation of scientific research programs and projects on topical problems of combating corruption, including with the involvement of national and international grants.

In addition, within the framework of the Global Resource for Anti-Corruption Education and Empowerment of Youth (GRACE) program:

to take measures to attract foreign investments, grants and sponsorship in order to create high-quality multiplication films, video and audio materials;

translation of educational materials into the state language (dubbing of film, video and audio materials) and placement in the Virtual Academy.

It is stipulated that the Virtual Academy should organize the educational process in the field of anti-corruption, including the development of curricula and programs and the placement of information about courses in the Virtual Academy [1]. In addition, within the framework of the Global Resource for Anti-Corruption Education and Youth Empowerment (GRACE) program, implemented on the initiative of the United Nations Office on Drugs and Crime, it is necessary to implement systematic measures aimed at forming an anti-corruption culture and strengthening the principles of honesty and integrity in the minds of young people. In this direction, first of all, it is advisable to convey anti-corruption knowledge to the general public, especially to the youth audience, in a simple, understandable and effective form by creating high-quality animated films, videos and audio materials based on modern pedagogical and information and communication technologies.

At the same time, in the process of developing these media products, it is necessary to develop mechanisms for attracting foreign investment, participating in international and national grant programs, as well as mobilizing sponsorship donations based on the principles of social responsibility. In this regard, expanding cooperation on the basis of public-private partnerships, launching integrated projects with international organizations, non-governmental non-profit organizations, and scientific and educational institutions will be of great importance. Diversifying financial resources will ensure the sustainability and quality of the content created.

Translation of educational materials into the state language, in particular, professional dubbing of animated films, videos and audio materials and their adaptation to the national mentality and cultural values is an important factor in increasing the effectiveness of education. In the translation process, terminological accuracy, correct interpretation of legal concepts and preservation of the scientific method should be ensured. It is also advisable to form an open and continuous educational environment by systematizing the adapted materials in digital format and placing them on the Virtual Academy platform.

Within the framework of the Virtual Academy, it is required to comprehensively organize the educational process in the field of combating corruption, that is, to develop curricula and programs based on a modern competency-based approach, to form courses based on a modular system, to introduce elements of distance learning, to develop interactive tests and assessment criteria. Also, publishing detailed annotations, goals and objectives, learning outcomes, methodological materials used and assessment criteria for each course on the Virtual Academy platform ensures transparency and openness of the educational process.

In addition, it is necessary to implement mechanisms for monitoring user activity, forming an analytical database, assessing the effectiveness of training courses, and regularly updating content within the platform. The introduction of digital educational resources will serve to disseminate knowledge and skills in the field of combating corruption to the general public, improve the legal culture of young people, and form an uncompromising attitude towards corruption in society

The socio-psychological roots of corruption can be traced back to:

1. Self-interest and needs (related to Maslow's hierarchy of needs). The American psychologist A. Maslow's pyramid of needs states that humans primarily seek to satisfy

physiological and security needs. If these needs are not fully satisfied, there are instances of attempts to solve some needs by illegal means, i.e. by intervening in corruption [2]. For example, a low-paid public servant may be tempted to accept a bribe in order to meet family financial needs. Putting self-interest above the public good creates an environment of corruption. This shows that the root of corruption is not individual needs, but social inequality and unequal distribution.

2. Indifference in the social environment: In an environment where corruption is accepted as a social norm, the mechanisms to combat it are weakened [3]. When there is a general indifference to corruption among citizens, when the stereotype is strong that "everyone does it", it becomes widespread. People start to accept it as normal to take or give a bribe, and they start to act like that. For example, instead of taking a test to get a driver's license legally, most people think it's a simple matter to get a license through bribery or dating. As long as there are no objections or legal grounds, this behavior becomes entrenched in the public mind as a normal norm. Social indifference is not just indifference, it's also passive indifference. The French philosopher Voltaire's idea that "evil comes not only from the wicked, but also from the silent" illustrates the importance of direct participation of society in the fight against corruption.

3. The erosion of moral standards; as our First President pointed out, a spiritually strong people cannot be defeated by external enemies, on the contrary, a society without spirituality will suffer internal decay and will be in a self-destructive state. This reflects the importance of the role of spirituality in the development and sustainability of society [4]. The moral crisis is when self-interest is put before shared values. As a person no longer values honesty, conscience, justice, he evaluates his actions not from the point of view of the law and society, but only from the point of view of profit.

4. Low legal literacy. Weak legal culture and civic awareness leads to a lack of acceptance of corrupt behavior as a crime [5]. In order to fight corruption, a person must know his rights and obligations, as well as the responsibility for corrupt actions. When legal literacy is low, people don't recognize a corrupt act, they don't see it as a crime. In the fight against this disease, the leading role is played by the inner culture of the individual, his mental position and moral immunity.

The book is one of the most effective sources for shaping the human mind. Ethical, legal, historical and literary literature in particular can be a powerful tool in forming a negative attitude towards corruption in readers. This process should be carried out in the following directions:

Building moral immunity in the students. Moral immunity can be boosted through literature. For example, through the novel "Days Gone By", young people understand the vital importance of justice and fairness. The heroes of the play, their lives on the path of honesty and corruption, teach the reader a profound lesson. This will help students build their own immunity to injustice and corruption, and give them a broader understanding of what it means to fight injustice and corruption.

Formation of legal awareness and sense of responsibility in students. Academic and legal literature (e.g. laws, resolutions and decrees on combating corruption, international conventions) provides readers with an understanding of the structure of the state, its functions and consequences of corruption, and allows them to understand the extent to which corruption can destroy the state.

Formation of social analysis and critical thinking skills in students. Publicist and analytical literature helps the younger generation to analyze the real situation in society, to understand justice, to protest and to form a civic position, how to react in the face of corruption.

Approaches to build immunity against corruption in students include:

The historical and pedagogical approach. Through historical literature, including "The Traps of Temur" and "Sahihi Bukhari", historical figures teach how to implement the principles of just governance and how to earn an honest living, and how not to betray anyone's right. This, along with historical pride and the desire for justice, will reinforce the desire for a just and honest life in the minds of young people.

Implementation of spiritual education through artistic works. In literature classes, analyzing works that reveal current topics related to corruption, engaging students in debate, allowing students to clearly visualize how corruption will affect the future, will create a broader view of corruption.

Educate students in legal literacy. In schools and universities, students are educated about the rule of law, legal responsibility and the consequences of corruption through subjects such as “Basics of legal culture“ , “Civil society“ and “State and legal bases”. Develop critical thinking and self-awareness skills. Teaching students to analyze corruption cases and propose alternative solutions develops their critical thinking skills.

In conclusion, corruption is a complex socio-legal phenomenon that poses a serious threat to the development of society, and its roots are not only in legal gaps, but also in the spiritual and moral world of the individual, the social environment and the level of legal literacy. Global experience and national research shows that the fight against corruption should not be limited to punitive and supervisory mechanisms. On the contrary, continuous education, legal culture, moral education and social activism are important for the formation of sustainable immunity to corruption in society. The process of building immunity against corruption requires the close cooperation of the educational system, the family, society and the state. Only if each person actively participates in the fight against corruption through his legal knowledge, moral position and civic responsibility, the intolerant attitude to this evil will be established in society. As a result, a strong foundation will be created to build a fair, transparent and sustainable society.

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SOCIAL-PSYCHOLOGICAL DETERMINANTS AND DEVELOPMENT MECHANISMS OF FAMILY LIFE READINESS AMONG MALE STUDENTS

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Abstract. *This article proposes a rigorous conceptual and empirical framework for investigating the social-psychological readiness of male students for family life, a critical yet often under-researched transition in adult development. Moving beyond traditional descriptive approaches, this study treats family readiness as a complex, multidimensional construct. It integrates four core dimensions: (1) value-motivational orientation, focusing on the internal alignment with fatherhood and marital stability; (2) cognitive understanding, involving the internalization of evolving family roles and legal-ethical responsibilities; (3) emotional-volitional stability, emphasizing resilience and self-regulation during domestic conflict; and (4) communicative competence, defined as the capacity for non-violent, constructive dialogue within a partnership. The paper argues that successful family formation and long-term marital sustainability depend on the systematic identification of internal determinants—specifically the locus of control and gender-role attitudes—and the activation of external mechanisms, such as proactive social modeling and targeted psychological interventions. By employing a mixed-methods research design, the article outlines how universities can transition from implicit assumptions about student maturity to evidence-based assessments of psychological preparedness. The proposed model provides a diagnostic blueprint for developing specialized support programs aimed at reducing marital instability and enhancing the socio-psychological health of the modern family institution.*

Keywords: *family life readiness, male students, social-psychological determinants, development mechanisms, family roles, gender-role attitudes, empirical research design, emotional intelligence, marital stability.*

INTRODUCTION

At present, social psychology lacks adequate theoretical models to fully explain the process of young men's readiness for family life. Existing theories—such as Erikson's psychosocial development theory and Bandura's social learning model—primarily address general personality development. However, they do not sufficiently elucidate the socio-psychological mechanisms that shape family role identification in young men, nor the psychological determinants influenced by specific cultural contexts.

The essence of this theoretical gap is as follows: first, existing socio-psychological models fail to explain the phenomenon of cognitive dissonance occurring at the intersection of traditional national values and modern societal demands; second, the integrative modeling mechanisms of the psychological components of family readiness (emotional stability, social responsibility, internal locus of control) have not been scientifically established; third, there is a lack of a conceptual approach that scientifically explains the psychosocial readiness paradigm forming within Eastern cultures.

Family life is no longer merely a traditional rite of passage or a static social status; it has evolved into a complex, dynamic social-psychological commitment that demands an unprecedentedly high level of individual readiness. In the contemporary era, characterized by rapid social transformations and the blurring of traditional gender boundaries, the stability of the family institution increasingly hinges upon the psychological preparedness of young men to navigate multifarious marital and parental roles.[5] International and national frameworks, including the strategic mandates of the Republic of Uzbekistan, emphasize that the long-term sustainability and moral health of a society are intrinsically rooted in the stability of the family unit. This, in turn, necessitates a systematic and targeted preparation of youth for responsible partnership and conscious fatherhood [1][6].

However, a significant and alarming gap persists in the current pedagogical and psychological landscape: while higher education systems are highly proficient at developing professional and technical competencies, the internal "psychological mechanisms" and "determinants" that predict a young man’s resilience and success in family life remain largely unmeasured, unmapped, and underdeveloped. This academic neglect creates a "readiness deficit." If a male student enters marriage psychologically unprepared for the shifting dynamics of modern egalitarian roles or the emotional demands of traditional expectations, the volatile reality of daily marital life will inevitably expose this deficit through chronic conflict, emotional alienation, and eventually, the dissolution of the marriage.

Contemporary policy documents have correctly stressed the imperative for higher education to integrate family values as a core pillar of personality development rather than a peripheral elective [3]. Yet, the uncomfortable truth remains that most teacher preparation and university programs treat family readiness as an implicit byproduct of maturity—an assumption that is frequently invalidated by rising divorce rates among young families. The prevailing educational models fail to identify the specific social-psychological determinants—such as the internal locus of control, emotional intelligence, and role flexibility—that govern a man's behavior under the inevitable pressures of domestic and economic life.

Psychological readiness for family life is the potential of a young man as a person to consciously deal with family relationships, roles in marriage, problem situations, emotional needs and social norms. This preparation is formed not only at the level of individuality, but also under the influence of a sociocultural and social psychological environment – "psychological preparation for marriage strengthens personal compatibility and mutual trust» [7;144].

Consequently, there is an urgent scientific need to move beyond mere descriptive analysis of "current attitudes." Research must transition toward a causal and structural understanding of how these determinants can be identified and, more importantly, how the underlying development mechanisms can be activated through specialized psychological interventions. The purpose of this study is to bridge this gap by providing an evidence-based roadmap for transforming potential readiness into functional marital competence.

MATERIALS AND METHODS

The contemporary logic of family readiness is grounded in the synergy of internal personality traits and social modeling. Social-psychological readiness is not a singular trait but a multi-dimensional construct. According to psychological theory, readiness is shaped by internal determinants—such as the locus of control and emotional intelligence—and external mechanisms like social learning and cultural gender-role expectations [2][6]. Historically, Eastern and Western models of family preparation have diverged, but modern research suggests that for today’s male

students, the "load-bearing walls" of readiness are value-motivational orientation and gender-role flexibility [5].

From a psychological perspective, two constructs are critical: subjective control (locus of control) and marital self-efficacy. Subjective control determines whether a young man views himself as the master of his family's destiny or a victim of circumstances. The Locus of Control Scale (J. Rotter) and the Gender-Role Questionnaire (S. Bem) are essential for quantifying the cognitive and emotional stance of future husbands [4]. Self-efficacy in the family context predicts whether a man will persist in resolving conflicts, collaborate with his partner, and manage the emotional labor of fatherhood. Importantly, the relationship between these determinants is not trivial: research shows that high internal locus of control often correlates with lower levels of gender-role conflict and higher readiness for constructive dialogue [6]. This evidence supports a study design where both internal determinants and developmental mechanisms are measured jointly.

RESULTS AND DISCUSSION

A rigorous study must address research questions that link psychological determinants to future family stability. Key questions include: (1) What is the baseline profile of male students' readiness across cognitive, motivational, and emotional components? [5] (2) How does the locus of control relate to gender-role attitudes among students? (3) Does a targeted psychological intervention (e.g., a socio-psychological training program) produce measurable change in family life readiness? (4) Which internal mechanisms best predict constructive conflict resolution in simulated marital dilemmas? [2] Hypotheses should assume that an internal locus of control and high emotional intelligence will be positively associated with overall readiness, while rigid gender-role stereotypes will negatively impact communicative competence.[6]

A feasible design for this research is a mixed-methods, longitudinal approach: quantitative measurement at three points (T1: Baseline; T2: Post-intervention; T3: Follow-up after 6 months) combined with qualitative interviews or reflective journals. Sampling should focus on 3rd and 4th-year male students, recording their prior family background and marital status as these variables significantly shape baseline attitudes [5]. Ethical safeguards are paramount: data must be de-identified, as readiness for family life is a deeply personal and potentially sensitive topic for young men. To ensure results translate into practice, instruments must map directly onto the proposed model.

CONCLUSION

An empirical study of the social-psychological readiness of male students for family life is both timely and essential within the context of modern higher education and family sociology. The rising complexity of marital relations and the shift in gender roles create an urgent need to prepare young men who can approach family formation with psychological competence and stability, rather than relying on outdated stereotypes or trial-and-error methods.

The proposed research model treats family readiness not as a static state, but as a multi-component construct and recommends a systematic approach to identifying its internal and external determinants. By focusing on specific predictors such as the locus of control, emotional intelligence, and gender-role flexibility, the study moves beyond mere description to a causal understanding of why some young men are more prepared for domestic responsibility than others. The use of validated psychometric tools—including the Locus of Control Scale and Gender-Role Questionnaires—provides a robust measurement core for assessing the "determinant" phase of the research.

The strongest practical contribution of this design lies in its developmental mechanisms. The study identifies that readiness is not improved through general lecturing, but through targeted psychological interventions such as cognitive reconstruction and reflective-evaluative training. These mechanisms allow for a measurable transformation in how male students perceive fatherhood, marital conflict, and emotional support. The diagnostic value of this approach is significant: it allows educators and psychologists to identify which specific components of readiness (e.g., communicative or motivational) are lacking and evaluate whether specialized training programs effectively bridge these gaps.

For higher education institutions, the implication is straightforward: if universities aim to produce socially responsible graduates who can build stable families, they must incorporate family readiness into the broader psychological support curriculum. Preparing for family life should be treated as a professional-level competency that requires explicit teaching and psychological modeling.

Family stability is not a decorative social goal; it is the foundation of national social security. The purpose of this research is not merely to gather data, but to build a clear "road map" from psychological assessment to targeted development and finally to stable marital behavior. When such a mechanism is established, the preparation of young men for family life shifts from being a matter of guesswork or tradition to an evidence-driven process of personality development —ensuring that future husbands and fathers enter family life with fewer illusions and more effective psychological tools.

In conclusion, the preparation of young people for family life as a socio-psychological process is complex and multifaceted, it is accompanied by a harmonious combination of personal, social and cultural factors. For the effective organization of this process, a stable methodological approach is necessary, which should rely on a system aimed at the individual, built on values, taking into account the principles of gender equality and developing communicative and emotional competencies – "gender roles in the family teach young people to make responsible decisions» [8;59].

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SOCIO-PSYCHOLOGICAL CHARACTERISTICS OF CORRECTING THE MENTAL STATE OF WOMEN SUBJECTED TO VIOLENCE

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Abstract. *This article analyzes the psychological shifts observed in women subjected to violence, specifically focusing on Post-Traumatic Stress Disorder (PTSD), decreased self-esteem, and social isolation. The study is based on specialized data aimed at the psychological correction of women survivors of violence. The findings emphasize that correctional interventions are of paramount importance in enhancing socio-psychological resilience and reconstructing the "Self-concept" of women.*

Keywords*: violence, mental state, correction, post-traumatic stress (PTSD), "Self-concept", socio-psychological stability.*

INTRODUCTION

Today, women are subjected to physical and sexual violence on a broad scale. According to the World Health Organization (WHO), this figure accounts for 36% of the female population globally [1]. This statistic represents a critical indicator that harassment and violence against women remain one of the most pressing global issues. Violence against women is a gender-based act that results in, or is likely to result in, physical, sexual, or psychological harm or suffering. This includes threats of such acts, coercion, or arbitrary deprivation of liberty.

Violence against women is one of the most widespread yet hidden violations of human rights. It is well-established that domestic violence leads to the collapse of the family unit and exerts a profoundly negative impact on its members. This, in turn, triggers psychological disorders in children being raised within such environments. In contemporary society, there is a pervasive perception that victims are to some extent "to blame" for the violence committed against them. Often, the public views domestic violence merely as a "private" or "family matter," disregarding the severity of such offenses. Furthermore, both relatives and officials frequently shift the blame onto the woman.

Women subjected to violence endure not only physical and psychological trauma but also face significant social challenges. Their self-assessment of their social status, self-confidence, and social connections can be severely weakened. From a socio-psychological perspective, survivors of violence often feel socially isolated, distrustful, and lonely. This state diminishes their active participation within groups, complicates their adaptation to the external environment, and creates barriers to establishing new social relationships.

MATERIALS AND METHODS

The modern logic of socio-psychological rehabilitation for women subjected to violence is anchored in human rights and personal integrity. Within this framework, psychological trauma is viewed not merely as a "personal tragedy" for the woman, but as a systemic failure of the socio-psychological protection mechanism. Legislation, specifically the Law "On the Protection of Women from Harassment and Violence," defines women's safety as a guaranteed right and

emphasizes the creation of a violence-free environment [2]. It is essential to note that rehabilitation extends beyond providing temporary shelter; it involves actively removing psychological barriers, implementing cognitive changes, and preparing women for an independent life.

Historically, theories of trauma psychology have advocated for the principle of inclusivity for all survivors. These frameworks link correctional reforms with professional psychological support at both emotional and behavioral levels, asserting that a comprehensive approach is central to sustainable recovery [3]. Collectively, these theories define clear practical outcomes: correctional work must be evaluated not only by subjective feelings but also by the readiness for social adaptation under real constraints such as social stereotypes, economic dependence, and the pressure of fear.

Significant scientific research has been conducted on the socio-psychological characteristics of women survivors of violence. Notably, A.S. Zubriskaya categorized these socio-psychological traits into specific types:

1. Low Self-Esteem: An inability to adequately assess one's potential. The abuser instills and reinforces a belief in the woman's incompetence, convincing her that she is responsible for the violence committed against her.
2. Dependency: The woman may lack the drive to leave the abuser and sometimes exhibits masochistic tendencies. She often defines her identity through her relationship with others, primarily the abuser.
3. Deficient Communication Skills: Survivors of domestic violence often lack effective relationship-building skills. This results in an inability to manage anger, a failure to understand personal needs, and a lack of conflict-resolution techniques. Such women often struggle with psychological and physical boundaries, either trusting too quickly or not trusting anyone at all.
4. Isolation: Survivors are often isolated due to the abuser's strict control over their social connections. Cut off from society and new information, the woman becomes increasingly dependent. Following incidents of physical abuse, shame and fear lead to further emotional and physical self-isolation.
5. Helplessness: This stems from the aggressor's dominance, active control, and the desire to manipulate the victim. The sense of helplessness can be so profound that the woman becomes incapable of making decisions, practicing self-care, or planning for the future. This often leads to depression and suicidal ideation, yet the survivor may cling to the hope that her partner will change.
6. Active Use of Psychological Defense Mechanisms: Acknowledging the reality of domestic violence is psychologically difficult and stigmatized. While defense mechanisms (e.g., justification and denial) may initially help a victim cope, they eventually lead to the minimization or denial of violent incidents. This unconscious process results in deteriorating mental and physical health and is often accompanied by an inability to distinguish emotions and a lack of logical reasoning.
7. High Levels of Anxiety [4].

Violence is a complex set of actions or relationships that cause physical, psychological, or sexual harm. This phenomenon negatively impacts not only the individual's mental state but also their social standing and personal development. For women and girls, the experience of violence creates significant barriers to psychological stability, social activity, and personal growth.

Firstly, survivors exhibit various mental health disorders, including depression, Post-Traumatic Stress Disorder (PTSD), anxiety, and low self-esteem. These conditions weaken the individual's ability to perceive and manage emotions, causing internal imbalance.

Secondly, violence leads to social difficulties. Survivors often feel lonely and alienated, which hinders the establishment of new connections, professional activity, and the development of healthy family relationships.

However, recent studies indicate that the experience of violence can sometimes trigger personal growth. In this process, known as Post-Traumatic Growth (PTG), women begin to view their lives, values, and opportunities through a new lens. These changes help increase inner strength and restore independence and self-confidence [5].

Russian psychologists, studying the socio-psychological characteristics of domestic violence survivors, have identified symptoms of mental passivity, social isolation, and instability. For instance, Sinyuk and Pavlyukovets demonstrate that these women typically feel under constant surveillance and respond with high sensitivity to external threats. Their mental state is dominated by passivity, social withdrawal, and guilt. Their self-worth is diminished, and they lose the internal conviction needed to change their situation [6].

Semerikova and Anisimova identified a widespread condition known as "Victim Behavior" among survivors. This manifests as distrust toward the external environment, emotional instability, and vulnerability to stress. Survivors may abandon an active life position and begin to accept violence as a natural occurrence [7]. Research by Rostovskaya and colleagues shows that chronic violence leads to emotional instability, decreased stress resilience, and a sharp decline in social activity. These factors weaken the woman's potential to defend her rights and slow down psychological recovery [8]. Finally, M. Kravchuk's analysis reveals that survivors often possess unclear ego-boundaries, low self-esteem, and a strong dependence on external control. They feel a lack of agency over their own potential, which limits their ability to make empowered decisions [9].

RESULTS AND DISCUSSION

Initially, to identify the socio-psychological characteristics of women survivors of violence, an author-developed survey titled "Determining the Level of Violence Among Women" was conducted. In the practical phase of the study, this 15-item questionnaire was administered in two regions Sirdaryo (N=75) and Surxandaryo (N=32) to assess and evaluate the mental state of women subjected to violence. The survey questions covered various psychological dimensions, including mental and physical well-being within the family, control, freedom, self-esteem, stress, and trust. Responses were measured using a 3-point scale: "Yes" (3 points), "No" (1 point). The following analysis highlights regional differences across key indicators:

Opportunity for Free Communication: 43.8% of women in the Surxandaryo region reported feeling free to communicate, whereas this figure was only 29.3% in the Sirdaryo region, indicating lower opportunities for free exchange of thoughts in Sirdaryo.

Physical Violence: 28% of respondents in Sirdaryo reported experiencing physical violence, compared to a higher rate of 37.5% in Surxandaryo.

Verbal Threats and Discrimination: High levels of "Yes" responses (approximately 40%) were recorded in both regions, signifying the prevalence of psychological pressure.

Control and Restriction of Personal Freedom: 38.6% of women in Sirdaryo and 37.5% in Surxandaryo reported being under constant surveillance and control.

Post-Violence Symptoms: High indicators were observed for psychological distress, stress, depression, and insomnia. In Surxandaryo, 40.7% of women reported frequently experiencing these symptoms.

Feelings of Loneliness and Vulnerability: 30.7% of women in Sirdaryo and 34.4% in Surxandaryo admitted to experiencing these emotional states.

Perceived Lack of Agency: High percentages were recorded regarding the "inability to change the current situation": 34.7% in Sirdaryo and 37.5% in Surxandaryo.

The analysis indicates that psychological pressure, restricted personal freedom, and weak social support negatively impact the psychological state of women. The survey results demonstrate that women frequently face psychological and social forms of violence, which severely affects their self-esteem, interaction with the outside world, mental stability, and future plans.

Regarding age-specific data, the 20-30 age group in Gulistan city showed a 22.6% incidence of violence, coinciding with the period of family formation. Observations suggest that jealousy is a leading motive for violence during this stage, alongside a shift in traditional family values among young couples. In Surxandaryo, 18.4% of women aged 20–30 fell victim to violence. This lower rate is partly attributed to the prevalence of multi-generational family structures where traditional social control serves as a mitigating factor.

The highest incidence of violence was observed in the 30–40 age group: 26.8% in Gulistan and 21.6% in Termez. The primary motives reported were disproportionate perspectives and financial difficulties, as well as the maldistribution of functional roles within the family and a lack of mutual respect and equality. As women age, the incidence of violence tends to decrease. In the 40–55 age range, the figures were 8.2% in Gulistan and 4.6% in Termez, dropping to 3.2% for women over 55 in both regions. This trend is explained by an increased pursuit of stability and mutual cooperation in interpersonal relationships with age.

To determine the effectiveness of the intervention, psychocorrectional and psychotraining methods were applied to the experimental group. Empirical results for both the experimental (N=52) and control (N=55) groups were processed using SPSS 22.0. Significant positive shifts were observed in the experimental group, particularly regarding depression levels, anxiety, and social adaptation indicators.

Statistical comparisons using Timothy Leary's Interpersonal Diagnosis methodology analyzed eight major factors of interpersonal relationships. The results showed that after the training, positive aspects of the "Self-concept" (leadership, independence, cooperation, tolerance) strengthened in the experimental group, while negative traits (aggression, distrust, submissiveness, shyness) decreased. This confirms the effectiveness of psychocorrectional interventions in promoting positive dynamics in the personal and social adaptation of survivors of violence.

CONCLUSION

The socio-psychological characteristics of women subjected to violence lead to profound and multifaceted transformations in both their personal and social functioning. This research demonstrates that such women frequently experience psychological states characterized by persistent guilt, mental passivity, social isolation, and a profound loss of the sense of security. These conditions significantly diminish their perceived agency to defend their rights and their capacity to alter their current circumstances.

Furthermore, the stress and traumatic experiences associated with violence erode self-confidence and weaken self-esteem. Consequently, this results in reduced social participation, difficulties in interpersonal relationships, and restricted opportunities for personal development.

Therefore, there is an urgent necessity to conduct in-depth studies on the socio-psychological state of women survivors and to establish a comprehensive system of integrated psychological and social support.

Only through such a holistic approach can the mental health of women be restored, their rights and interests protected, and their active participation in social life ensured. These processes play a vital role in fostering social stability and upholding the fundamental principles of human rights.

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