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# PEDAGOGICAL AND THEORETICAL FOUNDATIONS OF ARTIFICIAL INTELLIGENCE APPLICATION IN THE PROFESSIONAL TRAINING OF FUTURE PRESCHOOL EDUCATORS

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## Abstract:

The article examines the pedagogical and theoretical foundations of the application of artificial intelligence technologies in the professional training of future preschool educators. Modern trends in the digitalization of education are analyzed, the essence of the concept of artificial intelligence in the pedagogical context is revealed, and its potential for developing the professional competencies of future specialists is determined. Particular attention is paid to issues of personalized learning, the development of digital literacy, the improvement of students' methodological training, and the enhancement of the effectiveness of the educational process. The necessity of integrating artificial intelligence technologies into the system of higher pedagogical education is substantiated as an important condition for training competitive specialists for preschool educational institutions.

## Keywords

Artificial intelligence, professional training, preschool education, future educators, digitalization of education, professional competence, digital literacy, educational technologies, teacher education.

## Introduction

The current stage of societal development is characterized by the rapid implementation of digital technologies in almost all spheres of human activity. One of the most significant achievements of the digital era is artificial intelligence (AI), which is actively being introduced into education, healthcare, economics, and many other fields. Within the context of the modernization of the educational system of the Republic of Uzbekistan, the issue of preparing teaching personnel capable of effectively utilizing innovative technologies in their professional activities has become increasingly relevant.

The training of future preschool educators requires a revision of traditional approaches to organizing the educational process. A modern preschool teacher should possess not only pedagogical knowledge and professional skills but also a high level of digital competence

that enables the effective use of intelligent technologies for solving educational tasks. Consequently, there is a growing need for a scientific understanding of the theoretical foundations of artificial intelligence application in the professional training system of future preschool education specialists.

## Theoretical Foundations of Artificial Intelligence Application in Education

Artificial intelligence is understood as a set of technologies and methods that enable computers to perform functions traditionally associated with human intelligence, including information analysis, learning, decision-making, forecasting, and knowledge generation. In the educational sphere, artificial intelligence represents a complex of intelligent systems capable of adapting learning content to individual learner characteristics, analyzing educational outcomes, and providing personalized support throughout the learning process. The theoretical basis for implementing artificial intelligence in education is formed by the concepts of digital transformation, personalized learning, the competency-based approach, and adaptive educational systems. Contemporary studies demonstrate that AI technologies contribute to increased learning effectiveness through individualized educational pathways, automation of routine processes, and expanded opportunities for interaction between instructors and students.

Scientific literature identifies several major directions for the application of artificial intelligence in teacher education:

- intelligent tutoring systems;
- educational chatbots and virtual assistants;
- automated assessment systems;
- generative neural network technologies;
- educational analytics platforms;
- adaptive learning environments.

The use of these technologies contributes to improving the quality of teacher preparation and supports the development of modern professional competencies.

## Artificial Intelligence as a Tool for Developing Professional Competence

The professional competence of a preschool educator is an integrative personal quality that includes professional knowledge, pedagogical skills, value orientations, and practical experience necessary for the effective organization of educational activities.

In the context of educational digitalization, the structure of professional competence is expanding through the inclusion of digital and AI-related competencies. AI competence can be defined as the ability to understand the principles of intelligent systems, critically evaluate their outputs, and effectively utilize artificial intelligence tools in professional practice.

Artificial intelligence technologies contribute to the development of professional competence in future preschool educators in several ways.

First, they provide personalized learning opportunities. Intelligent educational platforms analyze students' levels of preparedness and offer individualized learning trajectories.

Second, they improve the quality of independent student work. Modern AI-powered services facilitate information retrieval, the creation of educational materials, lesson planning, and the analysis of pedagogical situations.

Third, they foster digital interaction skills and the ability to use modern information resources in professional activities.

Fourth, they expand opportunities for developing research competence through intelligent systems for data analysis and scientific information processing.

## Pedagogical Conditions for Effective AI Implementation

The effectiveness of artificial intelligence implementation in the professional training of future preschool educators depends on several pedagogical conditions.

The first condition is the establishment of a digital educational environment that provides access to modern intelligent services and educational platforms.

The second condition involves enhancing the qualifications of university faculty members in the field of artificial intelligence technologies.

The third condition is the integration of AI technologies into the content of pedagogical and methodological disciplines.

The fourth condition is the development of students' critical thinking and responsible technology-use skills. Particular importance is attached to issues of academic integrity, information security, and the ethical use of artificial intelligence.

Furthermore, it is essential to create a practice-oriented educational environment where future educators can apply intelligent tools while designing lessons, didactic materials, and educational projects.

## Prospects for the Development of Artificial Intelligence in Preschool Teacher Education

Current trends in educational technology indicate the continued expansion of artificial intelligence applications in teacher education. Of particular significance are generative AI models capable of producing texts, images, presentations, methodological materials, and other educational content.

A promising direction is the implementation of intelligent systems for supporting teaching practice and the creation of adaptive educational platforms that take learners' individual characteristics into account. International experience demonstrates that intelligent tutoring systems contribute to increased student motivation and greater educational effectiveness.

At the same time, the successful implementation of artificial intelligence requires the development of scientifically grounded methodologies, improvement of regulatory frameworks, and the formation of a culture of responsible digital technology use.

## Conclusion

Thus, artificial intelligence is becoming an important factor in the modernization of professional training for future preschool educators. Theoretical analysis demonstrates that intelligent technologies contribute to the development of students' professional competence, improve the quality of the educational process, and facilitate the acquisition of modern digital skills.

The integration of artificial intelligence into higher pedagogical education should be viewed as a strategic direction for preparing a new generation of specialists. The effective use of AI capabilities will ensure the training of competitive educators capable of successfully carrying out professional activities within the conditions of the digital transformation of society and education.

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