A MODEL FOR DEVELOPING TEACHERS' INNOVATIVE COMPETENCE BASED ON INTEGRATION OF ARTIFICIAL INTELLIGENCE TECHNOLOGIES INTO THE EDUCATIONAL SYSTEM

Jabborova Saodat Zoirovna
Associate Professor, Bukhara State Pedagogical Institute, (PhD)

Abstract: This scientific article is devoted to the theoretical substantiation and practical aspects of the model for developing innovative competence of pedagogical personnel based on the integration of artificial intelligence technologies into the education system. Also, the structural blocks of the model developed by the author - conceptual-purposeful, substantive, technological and result components - are scientifically covered. The model is aimed at improving the digital and methodological training of pedagogical personnel, combining their analytical, design and reflective skills with artificial intelligence tools.

Keywords: artificial intelligence, pedagogical personnel, innovative competence, education system, integration, development model, digital transformation, methodological training.

Introduction. One of the most important tasks facing the education system today is to ensure the adaptation of pedagogical personnel to new conditions in a rapidly changing technological environment, and to raise their professional competence to the level of modern requirements. The introduction of artificial intelligence technologies into education not only creates opportunities for individualization, automation and optimization of the educational process, but also fundamentally changes the content, methods and tools of pedagogical activity. In such conditions, the issue of developing innovative competence of pedagogical personnel becomes relevant, because only a teacher who can effectively use artificial intelligence tools and integrate them into the educational process with a creative and analytical approach can meet the requirements of today's generation. Innovative competence is understood as the ability of a teacher to introduce new ideas, advanced pedagogical and information and communication technologies into his practice, as well as to design, analyze and evaluate these processes. The development of this competence in connection with artificial

intelligence technologies requires the teacher not only technical knowledge, but also a new pedagogical way of thinking, the ability to manage the educational process based on information, as well as a deep understanding of issues related to ethical and methodological safety.

The integration of artificial intelligence technologies into the education system means, on the one hand, the introduction of intelligent teaching systems (adaptive learning platforms, intelligent tutoring systems), and on the other hand, the implementation of analytical tools supporting pedagogical activities (learning analytics, predictive modeling). The success of this process is largely determined by the readiness of pedagogical staff to accept new tools, their ability to combine them with their subjects and educational goals. Research shows that many pedagogical staff have two different attitudes towards artificial intelligence tools: one group sees them as a threat that can replace the teacher, while the other group sees them as a powerful assistant that facilitates the teaching process and increases its efficiency. In fact, artificial intelligence should not replace the teacher, but serve as a tool that expands his capabilities, freeing up time for the teacher for a creative and individualized approach by automating routine and time-consuming tasks. It is from this perspective that the model for developing innovative competence of pedagogical personnel should be focused on the formation of a conscious, critical and constructive attitude towards artificial intelligence technologies.

The proposed model consists of four main structural blocks: a conceptual-objective block, a substantive block, a technological block and a result block. The conceptual-objective block defines the scientific and theoretical foundations, basic principles and goals of the model. The guiding principles here are the principles of continuous professional development, personal orientation, integrativeness, reflexivity, practice-orientedness and ethical responsibility. The goal is to form the skills of pedagogical personnel to use artificial intelligence technologies strategically and creatively in the educational process, to harmoniously develop their analytical, design and reflective competencies. This block also includes the methodological basis of the model - systematic, active, competent and technological approaches.

The content block reflects the knowledge, skills and attitudes that are included in the innovative competence of pedagogical personnel. Within the framework of this block, the teacher acquires training in the following areas: the basics of artificial intelligence and areas of application in education; didactic possibilities and limitations

of using AI tools in the educational process; collection, analysis and interpretation of educational data (learning analytics); design of individual learning trajectories using artificial intelligence; adaptation of educational materials through intelligent systems; ethical and legal aspects of using artificial intelligence in pedagogical activities; critical assessment of assessment systems developed based on AI and interpretation of their results. An important feature of the content block is that it includes not purely technical knowledge, but integrative knowledge that prepares for the meaningful and responsible use of artificial intelligence tools in a pedagogical context. In this case, the deep knowledge of the teacher in his field of study is synthesized with artificial intelligence technologies, resulting in a new level of methodological competence.

The technological block includes mechanisms for the practical implementation of the model. This block provides for a number of forms, methods and tools for developing the innovative competence of teaching staff. These include: interactive trainings and workshops (for example, practical exercises such as "Artificial Intelligence in Education: Opportunities and Limits", "Analysis of Educational Data", "Working with Intelligent Learning Systems"); pilot implementation of AI tools in the real educational process and their evaluation based on pedagogical observation; implementation of projects as pedagogical experiments (for example, creating an adaptive test using artificial intelligence in one's subject, developing a model that predicts the dynamics of students' mastery); exchange of experience through mentoring and coaching; creation of methodological guides and resources on the use of artificial intelligence tools; participation in online communities and professional networks. An important aspect of the technological block is that it involves teachers not as passive listeners, but as active experimenters, researchers and partners. This, in turn, develops their reflexive skills and helps to form a personal pedagogical position in relation to artificial intelligence tools.

The resulting block includes criteria and indicators for assessing the levels of competence that are formed in pedagogical personnel as a result of the implementation of the model. This block assesses the cognitive, active and personal components of innovative competence. The cognitive component covers the teacher's system of knowledge about artificial intelligence technologies, their didactic capabilities, and ethical aspects. The active component includes the teacher's skills in the systematic and effective use of AI tools in the educational process, designing educational materials with their help, analyzing student results, and adapting teaching strategies. The personal

component includes such qualities as a teacher's readiness for innovative activities, ability to adapt to technological changes, critical thinking, reflexive evaluation of one's own activities, and a sense of moral responsibility. The uniqueness of the results block is that it evaluates the teacher's activities in working with artificial intelligence tools not only in terms of technical correctness, but also in terms of pedagogical expediency, suitability for the individual needs of students, and contribution to educational outcomes.

The introduction of artificial intelligence technologies in the education system places completely new demands on pedagogical staff - today's teacher is no longer just a specialist who knows his subject perfectly and conducts lessons based on traditional methods, but also needs to become a creative and critical thinker who can design the educational process in the conditions of digital transformation, analyze large volumes of educational data, work with intellectual systems, and most importantly, deeply understand the pedagogical capabilities of artificial intelligence tools, combining them with the specifics of his subject and the individual needs of students. It is from this perspective that the concept of innovative competence of pedagogical staff acquires a fundamentally new meaning: it is not limited only to the ability to use new technologies, but also includes an understanding of the logic of the operation of tools based on artificial intelligence, what changes they bring to the educational process, what ethical and methodological risks they can pose, as well as the skill of synthesizing these tools with specific educational goals and pedagogical values. As an important component of innovative competence, the analytical competence of the teacher is of particular importance - the correct interpretation of data on student activity (learning dynamics, error analysis, level of activity, cognitive load, etc.) collected using artificial intelligence, the adaptation of the teaching strategy based on them, and the implementation of an individual approach require a new level of analytical thinking from the teacher. At the same time, design competence also plays an important role - the teacher must have the skills to design educational materials, assessment systems, individual trajectories of students using artificial intelligence tools, that is, to reconstruct the entire educational process, combining technological tools with pedagogical goals. Reflective competence, on the other hand, represents the ability of a teacher to constantly analyze the process of using artificial intelligence in his or her work, to understand the problems that arise, to critically review decisions on the selection and application of tools, as well as to maintain a healthy critical attitude

towards the results of artificial intelligence. After all, no matter how perfect artificial intelligence systems are, they do not remove the responsibility for making the final decision in the pedagogical process from the teacher, but on the contrary, they require a deeper understanding of this responsibility, knowledge of the limitations of technology, and ensuring the primacy of the human factor in each pedagogical situation. Thus, the development of innovative competence of pedagogical staff based on the integration of artificial intelligence technologies into the education system requires not only introducing them to new tools, but also comprehensively raising their professional thinking, moral position, methodological skills and digital culture to a new level, which in turn requires continuous and systematically organized pedagogical support, a new generation of advanced training programs and the formation of an innovative environment in educational institutions.

The process of implementing the model into practice is envisaged to be carried out in several stages. The first stage - the preparatory stage - diagnoses the existing level of preparation of pedagogical staff in working with artificial intelligence technologies, identifies their needs and difficulties. The second stage - the training and pilot testing stage - pedagogical staff acquire the necessary knowledge and skills through specially designed trainings and practical exercises, and also uses AI tools in their activities as a test. In the third stage - the integration and consolidation stage - the systematic use of artificial intelligence tools by pedagogical staff is put into practice, a system of experience exchange and mentoring support is established. In the fourth stage - the monitoring and evaluation stage, the effectiveness of the model is measured, the dynamics of changes in the innovative competence of pedagogical staff are analyzed, and the necessary adjustments are made to the model.

Innovative competence of teachers is the ability of a teacher to effectively apply, create and adapt new ideas, technologies and methods in the modern educational process. This competence plays an important role in the professional development of a teacher.

Innovative competence of educators

Component	Content
Knowledge	Knowledge of modern pedagogical technologies, innovative approaches, ICT
Skills	Introducing new methods into the lesson, using technologies

Abilities	Creative thinking, flexibility, problem solving
Personal qualities	Initiative, openness to innovation, working on oneself
Direction of activity	Organizing innovative lessons, using interactive methods
Result	The quality of education increases, student activity and interest increase

The integration of artificial intelligence technologies into education is not only technically complex, but also pedagogically, psychologically and morally responsible. Therefore, the proposed model aims to develop the innovative competence of pedagogical personnel not only by technological preparation, but also by forming a culture of pedagogical thinking, the ability to make ethical decisions and a critical attitude towards their professional activities. The practical significance of the model is that it allows modernizing the system of advanced training of pedagogical personnel in educational institutions, adapting continuous professional development programs to new technological requirements, as well as strengthening the methodological base for the effective use of artificial intelligence tools in the educational process.

In the future, it is planned to conduct practical testing of this model in various educational institutions - general schools, colleges, higher education institutions - to evaluate its effectiveness based on empirical research and to develop options adapted to different disciplines and student contingents. In this regard, the model is open and flexible, with the possibility of continuous improvement in line with the changing requirements of the education system and technological progress.

The following table shows the achievements that can be achieved as a result of developing the innovative competence of teachers based on the integration of artificial intelligence technologies into the education system.

Direction	Achievements
Educational Quality	The effectiveness of lessons increases, an individual approach is strengthened
Teacher Skills	Skills in using modern technologies are developed
Student Engagement	Student motivation increases through interactive and interesting lessons

Personalized Learning	The opportunity to provide education that is appropriate to the abilities of each student is created
Time Efficiency	Assessment, analysis and planning processes are automated
Creative Approach	Creative thinking and innovative ideas are formed in teachers
Analytical Activity	Data-based decision-making is developed
Professional Development	The need for continuous learning and self-improvement increases
Digital Competence	The level of effective use of ICT and artificial intelligence tools increases
Educational Management	Monitoring and management of the educational process becomes easier

The introduction of artificial intelligence into education will turn teachers into modern, flexible and highly qualified specialists. As a result, the education system will become more effective, innovative and competitive.

Conclusion. The integration of artificial intelligence technologies into the education system is an important factor in developing the innovative competence of teachers. This process will enrich the modern knowledge and skills of teachers and bring their professional skills to a new level. As a result, teachers will have the opportunity to effectively organize the teaching process, apply an individual approach and improve the quality of education. Also, the use of artificial intelligence will facilitate the automation, analysis and management of the educational process. This will make the process of learning for students more interesting, interactive and effective. In general, this approach will accelerate the digital transformation of the education system and serve to train competitive, creative and modern pedagogical personnel.

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