

DIDACTIC EXPEDIENCY IN A TEACHER'S ACTIVITY AS A PEDAGOGICAL CONDITION FOR THE USE OF ARTIFICIAL INTELLIGENCE IN THE EDUCATIONAL PROCESS

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On the basis of the analysis of contemporary scientific research, the key factors influencing the effectiveness of AI implementation have been identified, including the didactic expediency of its application, the preparedness of teaching staff, the level of digital literacy of learners, the possibilities for personalized learning, and adherence to ethical standards.

To substantiate the pedagogical conditions that will contribute to the effective use of artificial intelligence in the educational activities of higher education students, we examined existing definitions of pedagogical conditions. In our view, the most justified and appropriate definition for the educational activities of higher education students is the following: pedagogical conditions represent the result of the purposeful selection, design, and application of content elements, methods (techniques), and organizational forms of teaching in order to achieve educational goals.

According to research conducted by international organizations, the implementation of AI in education contributes to the development of adaptive learning and improves the quality of educational outcomes; however, it requires consideration of pedagogical principles and values such as the humanization of education and the learner's subjectivity [4]. Contemporary scientific works emphasize that AI should not be regarded as a replacement for the teacher, but rather as a tool for enhancing the educational process [3].

Thus, research in the field of higher education shows that the majority of participants in the educational process consider AI as a supplement to the teacher's activity rather than a replacement for it [2].

The implementation of AI in the educational process opens up new opportunities for the personalization of learning, increasing teaching effectiveness, and expanding the intellectual resources of students. However, the successful use of AI is impossible without adherence to the principle of didactic expediency, that is, the alignment of technological tools with the goals of teaching and education. Didactic expediency in a teacher's activity is a key factor determining the effectiveness and ethical nature of AI integration. Let us consider in more detail the indicators of didactic expediency in a teacher's activity as a pedagogical condition for the use of artificial intelligence in the educational process:

- ***Alignment of AI with educational outcomes***

The first task of a teacher when using AI is to correlate the technology with specific educational outcomes. It is important to understand that AI is not an end in

itself, but merely a tool that should enhance the process of knowledge acquisition and competency development. For example, generative algorithms can help students analyze large volumes of information or create educational projects; however, without a clear connection to learning objectives, such tools risk becoming merely entertainment or a source of informational noise. A teacher must formulate expected learning outcomes, determine which competencies and skills students should develop, and only then select those AI tools that best contribute to achieving these goals.

Machine learning technologies, generative models, intelligent data analysis systems, and digital educational platforms are gradually changing not only teaching methods but also the very philosophy of the educational process. For Ukrainian universities, the issue of AI integration is particularly relevant, as the country is undergoing digital transformation, facing global competition, and addressing the need to prepare a new generation of specialists. This concerns not only the implementation of new technologies but also ensuring that the use of artificial intelligence contributes to the formation of competencies, the development of critical thinking, professional skills, and academic integrity [10]. Thus, the main task of universities becomes the creation of such an educational model in which AI acts as a tool for supporting learning rather than replacing human intelligence or pedagogical interaction.

The concept of aligning AI with educational outcomes: Educational outcomes are the knowledge, abilities, skills, and competencies that a student must achieve after completing an educational program or a specific course. Aligning AI with educational outcomes means ensuring correspondence between the use of artificial intelligence technologies and learning objectives. For example, if the learning outcome is the development of analytical thinking, then the application of AI should help students analyze information, compare sources, build arguments, and verify facts. If the educational goal is the formation of practical programming skills, then AI may be used for automatic code checking, generating hints, or modeling complex tasks. At the same time, there is a risk that excessive use of generative AI may reduce students' independence. Therefore, universities should develop clear rules for the use of AI in the educational process and define the boundaries of its application. Ukrainian higher education institutions are gradually integrating artificial intelligence tools into the educational process [1]. This is most actively taking place in technical universities, economic institutions, and universities related to the IT sphere.

Example 1. Teaching Computer Science Students

In many Ukrainian universities, students majoring in “Computer Science” use AI systems to study programming and data analysis. For example, students may apply generative models for:

- explaining complex algorithms;
- automatically identifying errors in code;
- creating test programs;
- modeling the operation of neural networks.

During the study of the discipline “Machine Learning,” students create their own data classification models, analyze large datasets, and learn to evaluate the

quality of algorithm performance. In this case, the educational outcome is not only knowledge of theory but also the ability to apply AI to solve practical tasks.

For example, students may develop systems for predicting academic performance or analyzing economic indicators. Thus, AI becomes a tool for professional training.

Example 2. The Use of AI in Language Education

Universities in Ukraine actively use digital platforms for learning foreign languages. Intelligent systems help students improve grammar, pronunciation, and writing skills.

Students of philological specialties may use AI for:

- automatic text translation;
- stylistic analysis;
- grammar checking;
- creating educational dialogues.

For example, while studying English, a student receives individualized tasks depending on their level of knowledge. The system analyzes typical mistakes and offers additional exercises. As a result, a personalized learning trajectory is formed, increasing the effectiveness of the educational process.

However, teachers emphasize that AI cannot completely replace live linguistic communication. Therefore, the educational outcome remains the student's ability to communicate independently, think critically, and conduct professional dialogue.

Example 3. Medical Education and Simulation Technologies

In Ukrainian medical universities, artificial intelligence is used to model clinical situations. Students can work with virtual patients, analyze symptoms, and make treatment decisions.

For example, an AI system may create a clinical case with a set of symptoms, test results, and medical history. The student must make a diagnosis and propose treatment. Afterward, the system analyzes the correctness of the decisions and provides recommendations.

Such technologies make it possible to:

- develop practical thinking;
- increase the speed of decision-making;
- form professional competencies;
- reduce the risks of errors during real medical practice.

In this case, the alignment of AI with educational outcomes is manifested through the development of students' clinical thinking and professional responsibility.

The integration of artificial intelligence into higher education has a number of important advantages. AI makes it possible to adapt educational materials to students' individual needs. The system can take into account the level of knowledge, learning pace, and peculiarities of information perception. Teachers may use AI for automatic test checking, analysis of academic performance statistics, and the creation of educational materials. This saves time and allows greater attention to be devoted to

creative and scientific work. The modern labor market requires graduates to be able to work with digital technologies. The use of AI in education contributes to the development of skills in working with data, algorithms, and information systems. For Ukraine, the role of digital technologies became especially important during the pandemic and martial law. AI helps organize distance learning, maintain communication, and ensure access to education regardless of students' location.

Despite significant advantages, the use of AI in education also involves certain risks. Students may use generative AI for automatically writing essays, term papers, or laboratory assignments. This creates problems in assessing real knowledge and skills. Excessive dependence on AI may lead to students ceasing to analyze information and search for solutions independently. Questions arise regarding data confidentiality, copyright, and responsibility for decisions made with the assistance of AI. Not all Ukrainian universities have equal technical capabilities. This may create digital inequality among students from different regions and educational institutions.

- ***Consideration of students' age-related and psychological characteristics***

The second indicator of didactic expediency is the consideration of learners' age-related, cognitive, and psychological characteristics. Children of primary and middle school age perceive information differently from senior school students or university students, and their ability to work independently with digital tools differs significantly. AI can offer adaptive tests, interactive simulations, or personalized learning pathways; however, without attention to students' psychological characteristics, the effectiveness of such tools is significantly reduced. The teacher must assess the level of development of students' thinking, attention, and emotional state so that the selected technologies do not overload them or cause stress. It is important that AI acts as support for students rather than replacing pedagogical communication or functioning as a mechanical generator of tasks.

An analysis of companies providing admission to Ukrainian universities over the past two years has revealed a steady trend of growth in the age characteristics of entrants to institutions of higher education [6]. The change in the age characteristics of Ukrainian students imposes on educators the responsibility for restructuring the educational process in accordance with the age of those they teach. Most adult students already have established mental models, experience of social behavior, professional activity, etc. [7]. We consider Ukrainian students aged 30+ and define them as "adult students" or UAS.

Previously, we conducted a study on the education of foreign students of adult age in the groups of the preparatory faculty for studies [6, 9]. We have formulated the androgogical principles of training such foreign students (FS) based on the research of M. Knowles and S. Zmeev. We emphasized the following principles: 1. *The principle of priority of self-study*; 2. *The principle of joint activities*; 3. *The principle using the available of a positive experience of FS*; 4. *The principle of individual approach to learning based on personal needs*; 5. *The principle of correction of outdated **experience** and personal attitudes* that impede the development of new

knowledge; 6. *The principle of electivity study*.; 7. *The principle of reflexivity*; 8. *The principle of contextual learning*; 9. *The principle of development with learning of FS*; 10. *The principle of mainstreaming training results*; 11. ***The principle of taking into account religious dogmas of confession belonging FS*** .

Distance education is the main feature of modern education. That is why we consider the use of principle 2. *The principle of joint activities* in modern training of UAS to be unnecessary. However, the use of modern gadgets and Internet learning technologies for adult students causes difficulties during classes and completing tasks independently. Therefore, principle 4. *The principle of individual approach to learning based on personal needs* takes on a broader meaning than in the previous conclusions regarding FS.

Ukrainian students differ from foreign students not only in basic training in a different education system. Others are religious preferences and peculiarities of mentality. In Ukrainian society, confessional differences are not sharp and such as to cause enmity between students. Therefore, we consider the 11th principle – ***The principle of taking into account religious dogmas of confession belonging FS*** irrelevant during the education of UAS.

Modern realities of educational processes are undergoing major transformations related to martial law in Ukraine. There is a prevailing shift from off-line education to on-line education, the loss of material resources by many educational institutions of different accreditation levels, and the loss of opportunities for conducting practical training at enterprises. Educators are successfully adapting to these realities and are doing everything possible to ensure the effectiveness of the educational process. However, a stable trend toward an increase in the age characteristics of applicants to higher education institutions has emerged. The reason for this was the possibility of entering educational institutions without External Independent Testing (EIT) in the 2022–2023 academic year and, for some specialties, without the National Multi-subject Test (NMT) in the 2023–2024 academic year. Today's students include individuals aged 30–50 years, and there are examples of students aged 70+. Each person has their own personal reasons for obtaining a first higher education degree at such an age or acquiring a new profession necessary for them.

The change in the age characteristics of Ukrainian students imposes responsibility on educators to restructure the educational process in accordance with the age of those they teach. It is well known that young people, who have traditionally been considered students, are energetic, attentive, and capable of perceiving new educational information. They possess the highest speed of working memory and well-developed involuntary memory. At this stage, there is the greatest plasticity in the formation of psychomotor and other skills.

Education provides a young person not only with knowledge and a professional diploma. At this age, the functional structures of the organism and the personal characteristics of students are formed. Learning should develop students' resistance to stress in later life. It is precisely young people who have the opportunity for stable,

resilient, and energy-efficient responses to stress. Education influences the development of operational thinking. Therefore, it is important to build the educational process logically and structurally [5]. During the learning process, students' thinking reaches the level of developing their own position in judgments. At first, young people rely on simple alternatives, but later the ability to demonstrate tolerance toward contradictory points of view is formed. Based on the development of intellectual abilities, a new type of values, a new value system, and a new attitude toward oneself are formed.

It should be noted that the processes of perception, memorization, and thinking in adults are not as productive as in children or adolescents [8]. In this regard, mnemonic memorization techniques become of primary importance. In addition, most adult students already possess established mental models, experience in social behavior, professional activity, and so on [6]. However, for an adult student, it is important to feel personal involvement in the learning process and to solve tasks independently. That is why the educational process should be built with the direct participation of adults themselves, making wide use of interactive teaching methods [5].

• *Selection of methods that enhance understanding rather than simplify learning*

The third key principle is the selection of such methods of AI use that enhance the learning process rather than simplify it. There is often a temptation to use AI to automate all aspects of learning: generating ready-made answers, tests, or essays. However, genuine learning consists not only in completing tasks but also in the development of critical thinking, the ability to analyze information, and the formulation of one's own conclusions. AI should serve precisely to deepen understanding: for example, through interactive simulations, modeling of complex phenomena, data analysis, or the development of creative projects. The following are technologies whose use improves the effectiveness of learning:

1. Virtual resources and libraries.
2. Virtual laboratories and simulation tools.
3. Online collaborative platforms.
4. Videoconferencing and online meetings.
5. Electronic tools for data analysis.
6. Social networks and forums.

A teacher, using these technologies, creates an environment where students think actively, compare different viewpoints, ask questions, and find answers together with a digital assistant.

Didactic expediency in a teacher's activity is a fundamental principle for the effective use of AI in education. Aligning technologies with educational outcomes, considering students' age-related and psychological characteristics, and selecting methods that enhance understanding rather than simplify learning allow AI to be integrated not as a replacement for the teacher but as a powerful tool for developing students' intellect, creativity, and independence. Only when these principles are

followed can digital technologies become a true partner in the educational process, contributing to the formation of a modern, competent, and critically thinking student.

Let us consider ways to effectively align AI with educational outcomes.

For the successful integration of AI into education, Ukrainian universities must adhere to several key principles. First, it is necessary to develop clear methodological guidelines for using AI in the educational process. Students should understand when the use of AI is permissible and when it violates principles of academic integrity. Second, it is important to change approaches to assessment. Assignments should evaluate not only the final result but also the thought process, reasoning, and ability to apply knowledge in practice. Third, universities must develop teachers' digital literacy. Educators should not only use AI but also teach students to critically evaluate the results produced by algorithms. Fourth, it is necessary to combine technologies with the humanistic values of education. AI should not replace the teacher's role as a mentor, educator, and organizer of the learning process.

Conclusion. Artificial intelligence is becoming an integral part of modern higher education and opens new opportunities for the development of Ukrainian universities. Its use promotes personalized learning, the development of digital competencies, and increased effectiveness of the educational process. At the same time, the success of AI integration depends on how well its application is aligned with educational outcomes. Ukrainian universities are already demonstrating examples of effective AI use in training students in technical, humanitarian, and medical disciplines. However, it is important to ensure a balance between technological innovation and the development of human competencies—critical thinking, creativity, responsibility, and academic integrity. Therefore, the future of education does not lie in replacing humans with artificial intelligence but in creating a harmonious interaction between technology and pedagogy, where AI serves as a tool to support students' professional and personal development.

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Abstract

The article examines the problem of didactic expediency in a teacher's activity as one of the key pedagogical conditions for the use of artificial intelligence in the educational process. Contemporary approaches to the integration of artificial intelligence technologies into the higher education system are analyzed, and the main factors influencing the effectiveness of their application are identified. The paper provides examples of the use of artificial intelligence in technical, language, and medical education and characterizes the advantages of personalized learning, adaptive digital platforms, and simulation technologies. Particular attention is paid to the issues of academic integrity, digital inequality, and the ethical aspects of using artificial intelligence in the educational environment.

Keywords: artificial intelligence, educational process, didactic expediency, pedagogical conditions, digital transformation of education, personalized learning,

digital competencies, academic integrity, pedagogical activity, higher education, innovative technologies, critical thinking, adaptive learning, professional training.