WAYS OF DEVELOPING STUDENTS' PROFESSIONAL QUALITIES THROUGH ARTIFICIAL INTELLIGENCE

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Abstract. The article addresses the pedagogical conditions aimed at developing students' professional qualities by means of artificial intelligence. Philosophical, sociological and pedagogical interpretations of the concepts of "condition" and "pedagogical condition" are analyzed, and the author's approach is substantiated. Based on an analysis of the pedagogical literature, the pedagogical conditions that contribute to the development of students' professional qualities are identified: the availability of skills for working with large data arrays; the didactic integration of digital technologies with traditional teaching tools; the formation of positive learning motivation; consideration of students' individual characteristics; and the stimulation of their creative activity. The importance of developing information culture among teachers and students, as well as the problem of determining the optimal ratio between artificial intelligence tools and traditional learning tools, is also considered.

Keywords: artificial intelligence, professional qualities, pedagogical conditions, information culture, learning motivation, traditional teaching tools, higher education.

Annotatsiya. Maqolada sun'iy intellekt vositasida talabalarning kasbiy sifatlarini rivojlantirishga qaratilgan pedagogik shart-sharoitlar yoritilgan. "Shart-sharoit" va "pedagogik shart-sharoit" tushunchalarining falsafiy, sotsiologik va pedagogik talqinlari tahlil qilinib, muallif yondashuvi asoslab berilgan. Pedagogik adabiyotlar tahlili asosida talabalar kasbiy sifatlarini rivojlantirishga xizmat qiluvchi pedagogik shart-sharoitlar aniqlangan: katta hajmdagi ma'lumotlar massivlari bilan ishlash ko'nikmalarining mavjudligi; raqamli texnologiyalarning an'anaviy o'qitish vositalari bilan didaktik integratsiyasi; ijobiy o'quv motivatsiyasini shakllantirish; talabalarning individual xususiyatlarini hisobga olish hamda ularning ijodiy faolligini rag'batlantirish. Shuningdek, o'qituvchi va talabalarda axborot madaniyatini rivojlantirishning ahamiyati hamda sun'iy intellekt vositalari va an'anaviy o'qitish vositalari o'rtasidagi maqbul nisbatni aniqlash muammosi ko'rib chiqilgan.

Kalit so'zlar: sun'iy intellekt, kasbiy sifatlar, pedagogik shart-sharoitlar, axborot madaniyati, o'quv motivatsiyasi, an'anaviy o'qitish vositalari, oliy ta'lim.

Аннотация. В статье рассматриваются педагогические условия, направленные на развитие профессиональных качеств студентов средствами искусственного интеллекта. Анализируются философская, социологическая и педагогическая трактовки понятий «условие» и «педагогическое условие», обосновывается авторский подход. На основе анализа педагогической литературы выявлены педагогические условия, способствующие развитию профессиональных качеств студентов: наличие навыков работы с большими массивами данных; дидактическая интеграция цифровых технологий с

традиционными средствами обучения; формирование положительной учебной мотивации; учёт индивидуальных особенностей студентов; стимулирование их творческой активности. Рассматриваются также значение развития информационной культуры преподавателей и студентов и проблема определения оптимального соотношения средств искусственного интеллекта и традиционных средств обучения.

Ключевые слова: искусственный интеллект, профессиональные качества, педагогические условия, информационная культура, учебная мотивация, традиционные средства обучения, высшее образование.

Introduction

Research into the pedagogical conditions aimed at enhancing students' professional qualities by means of artificial intelligence technologies requires, first of all, a clear definition of the content of this concept. In philosophy, the concept of condition is regarded as a category reflecting the relationship of an object with the surrounding phenomena without which the object cannot exist, since conditions form the environment in which a phenomenon arises and develops. In sociology, this concept is interpreted as an essential component of a set of objects on which a given phenomenon directly depends and whose presence inevitably gives rise to that phenomenon. Therefore, a "condition" can be understood as the circumstances and environment that serve as a potential basis for the emergence of an object or phenomenon and ensure its existence and further development. The specific feature of the concept of "pedagogical conditions" is that it covers all components of the educational process: goals, content, methods, forms and means.

Literature Review

According to V.I. Andreev, a pedagogical condition is "a circumstance of the learning process that results from the purposeful selection, design and application of content elements, methods and organizational forms of teaching in order to achieve certain pedagogical goals" [3]. Yu.K. Babansky includes the following among the pedagogical conditions ensuring the effectiveness of the learning process: the methodological and theoretical training of teachers; the availability of the necessary material and technical base (educational and methodological literature, technical aids, visual aids); and the moral and psychological climate [5].

We support V.I. Andreev's view that pedagogical conditions cannot be limited to a set of external factors influencing a process or situation, since the formation of a personality results from the harmony of subjective and objective, internal and external factors. Thus, pedagogical conditions are understood as conditions consciously created in order to ensure the most effective course of the educational process.

Identifying the pedagogical conditions for activating the learning process is not a new issue for the theory and history of pedagogy. S.I. Arkhangelsky, P.Ya. Galperin, N.F. Talyzina and other scholars studied the conditions for the effective management of learners' knowledge acquisition and highlighted the problems related to the development of their cognitive activity and independence [4; 7; 12].

Methodology

Among education specialists, there is a widespread view that the mere introduction of information technologies into the learning process is sufficient to modernize education and improve its quality. However, what is decisive in education is not technology itself but how appropriately it is used to achieve educational goals. For this reason, the choice of educational technologies should be based on an analysis of course content, the level of students' activity and engagement in the learning process, specific objectives and expected outcomes.

The purposeful use of digital technologies in the learning process of a higher education institution makes it possible to solve interrelated educational, methodological, organizational, technical and technological, software, socio-economic, regulatory and ergonomic problems.

The analysis of the pedagogical literature made it possible to identify and substantiate the following pedagogical conditions that contribute to the development of students' professional qualities by means of digital technologies:

• teachers and students possess the skills and abilities to work with large, constantly updated data arrays;

• didactically appropriate integration of digital technologies with traditional teaching tools;

• formation of positive learning motivation based on the diversity of digital educational technologies and their information and cognitive capabilities;

• consideration of students' individual characteristics when using digital technologies;

• stimulation of students' creative activity by means of digital technologies.

The first pedagogical condition for forming students' professional qualities on the basis of digital technologies is that teachers and students have mastered the skills and abilities to work with large, constantly updated data arrays.

Along with the development of information structures, numerous sign systems are emerging and developing in society; as a result, a multi-component "information space" is formed, which serves as a specific information environment for a person. This gives rise to the problem of the information (communicative) adaptation of the individual in society. A teacher who has not mastered information technologies is deprived of one of the important mechanisms of adaptation to a rapidly developing society [8].

A specific feature of information exchange in society is the problem related to the consumption of information. Whereas at earlier stages of human development the creation, use and transmission of information were the pressing issues, today the culture of selecting, storing and using accumulated and generated data has come to the fore. The problem of using data that help to form a holistic picture of the world and make it possible to foresee the consequences of decisions also remains relevant [15].

The informatization of education requires the creation of a system that treats the student as a subject and is aimed at educating a creative personality with flexible

thinking. The formation of a future teacher as a professional personality is based, first of all, on his or her pedagogical culture, which includes:

• striving to study pedagogical phenomena in their development and as a whole;
• the need for a theoretical understanding of one's own pedagogical activity;
• a critical approach to theory and practice;
• analysis of one's own knowledge and practical activity (reflection);
• awareness of the ideological and humanistic functions of pedagogy in modern society;
• the ability to reasonably refute unscientific psychological and pedagogical views [9].

V.V. Kuznetsova defines the pedagogical culture of a personality as a concept expressing the degree to which members of the teaching profession have mastered the psychological skills of pedagogical activity.

I.F. Isaev interprets information culture as the level of skills in purposeful work with information and in the use of information technologies in this process [9].

The term "information culture" entered scientific usage relatively recently; numerous scientific studies, as well as educational and popular science works, are devoted to various aspects of this concept.

Developing information culture among teachers and students implies forming a certain worldview and mastering a system of knowledge, skills and abilities that enable pedagogical activity to be carried out with the help of information technologies. With such an understanding of information culture, the confidence of teachers and students in, and their need for, the use of information technologies, including digital ones, becomes essential in forming professional qualities [9].

In our opinion, the use of digital technologies by students and teachers opens up broad opportunities for optimizing the learning process and improving the quality of knowledge owing to the following possibilities:

• applying new methods of presenting and processing data (on students' knowledge, activities, etc.);
• wider use of educational materials and visual aids;
• creation and practical application of digital technologies.

In summary, given the wide spread of informatization in the learning process of a pedagogical higher education institution, the main condition for realizing the educational potential and forming students' professional qualities is that teachers and students possess the skills and abilities to work with large data arrays.

The next pedagogical condition for forming students' professional qualities on the basis of digital technologies is the didactically appropriate integration of digital technologies with traditional learning tools and, on this basis, the creation of a holistic and effective didactic system.

Teaching tools are understood as material or ideal objects used by the teacher and the student in the process of acquiring knowledge [5]. Material tools include textbooks, study guides, didactic materials, primary sources, test materials, models, visual and educational aids, and laboratory equipment. We regard all of them as traditional

teaching tools. Digital technologies, as noted above, are a set of digital data used in the educational process.

According to N.P. Brusentsov, information technologies should be used in combination with traditional education, while the priority of traditional education is maintained [6]. Digital technologies serve mainly as a means of "forming and developing cognitive potential, information literacy and various styles of thinking" [8].

The introduction of information technologies into education has led to the emergence of new educational technologies and forms based on the digital processing and transmission of information. The use of powerful multimedia systems and interactive computer programs has laid the foundation for the rapid introduction of information technologies into education; however, despite the diversity of technical tools and technologies, the issue of improving the quality of education remains relevant. The level of knowledge depends, first of all, on the quality of the educational material, the form of its presentation and the organization of the learning process; therefore, the traditional education system also faces many problems associated with the continuously growing flow of information. In such a situation, placing emphasis solely on intensive independent work does not produce the expected results for the same reasons.

The introduction of digital technologies into the educational process not only frees the teacher from monotonous, repetitive work in organizing the learning process, but also makes it possible to create rich reference and illustrative materials presented in various forms, such as text, graphics, animation, sound and video clips. Interactive computer programs activate all types of human mental, speech, physical and perceptual activity and accelerate the mastering of the material. Computer simulators help students acquire practical skills, while interactive testing systems analyze the quality of knowledge. Thus, digital technologies make it possible to create a learning model that ensures a high level of professional qualities through a rational combination of traditional and computer-based forms of organizing the learning process [14].

In this regard, the problem of determining the optimal ratio between traditional textbooks and digital technologies arises. The introduction of digital technologies into education should not be an end in itself but a means of increasing its effectiveness. In any case, digital technologies cannot take over such important functions of the teacher's speech as the communicative and managerial ones, nor the responsibility for adjusting the educational material in the process of delivering it to students. The experience of higher education institutions shows that the use of electronic copies of traditional "paper" textbooks does not increase the effectiveness of training specialists; on the contrary, it sometimes becomes a negative factor compared with ordinary printed publications. Digital technologies should not completely replace traditional textbooks, since the level of comprehension of a text read from a screen is approximately 30% lower than that of the same text printed on paper. In addition, the certain negative impact of computers and monitors on human health is also one of the drawbacks of digital technologies.

In our view, the highest effectiveness of education, that is, the formation of professional qualities, is ensured when a carefully selected system of learning tools is

used, since no single learning tool can solve all educational tasks on its own.

The third pedagogical condition for improving the quality of students' knowledge by means of digital technologies is the formation of positive learning motivation owing to the diversity of digital technologies and their information and cognitive capabilities.

As the psychological studies of A.N. Leontiev, A.I. Savenkov, O.K. Tikhomirov and others have shown, the effectiveness of students' professional qualities is influenced by various motives [10; 11; 13]. The most important of them are: social motives reflecting the social significance of education; professional motives expressing the importance of learning activity in mastering a profession; and cognitive motives associated with acquiring new knowledge. The lack of certain motives significantly affects students' professional qualities and hinders the achievement of set goals. As I.G. Zakharova notes, the absence of positive internal cognitive motives leads to a formal attitude towards study: the student tries to "get through the exam session" by any means. During a short exam session, students mechanically memorize a large amount of educational material, but it is soon forgotten [8]. Professional motives determine the formation of students' professional qualities, and their insufficient development seriously affects the level of professional knowledge, skills and abilities.

Digital and artificial intelligence technologies offer considerable potential for overcoming these problems. Interactive simulations, gamified tasks, instant feedback and the visualization of complex processes make learning activity more attractive and meaningful for students. When students see the practical value of the material for their future profession and receive timely information about their progress, their cognitive and professional motives are strengthened. Thus, the diversity of digital tools, when used purposefully, becomes a source of positive learning motivation rather than mere entertainment.

The fourth pedagogical condition for developing students' professional qualities by means of digital technologies is taking into account students' individual characteristics when using these technologies.

Students differ in their level of prior knowledge, pace of learning, cognitive style, interests and professional aspirations. In traditional classroom instruction, the teacher is often forced to orient the presentation of material towards the "average" student; as a result, some learners lose interest because the material is too easy, while others fail to master it because it is too difficult. Artificial intelligence technologies make it possible to resolve this contradiction to a considerable extent. Adaptive learning systems analyze the results of a student's work, identify gaps in knowledge and automatically select tasks of an appropriate level of difficulty, thereby building an individual learning trajectory [14].

Intelligent tutoring systems, chatbots and AI-based assistants provide students with explanations at a convenient time and pace, offer hints and additional examples, and allow them to return repeatedly to difficult topics without fear of being judged. For the teacher, learning analytics data become a tool for diagnosing each student's progress and making timely pedagogical decisions. At the same time, as emphasized in international recommendations, personalization through artificial intelligence must

be accompanied by the protection of students' personal data, the transparency of algorithms and the preservation of the teacher's leading role in the educational process [15]. Consequently, the individualization of learning by means of artificial intelligence is effective only when the technology supports, rather than replaces, pedagogical interaction between teacher and student.

The fifth pedagogical condition is the stimulation of students' creative activity by means of digital technologies.

Professional activity in modern conditions requires a specialist not only to reproduce acquired knowledge but also to find non-standard solutions and to design and create new products. Creative activity is therefore one of the key professional qualities of a future specialist. Digital technologies, and artificial intelligence tools in particular, open up new opportunities for its development: students can model processes, carry out virtual experiments, create multimedia projects, analyze data and quickly test their hypotheses.

At the same time, the widespread availability of generative artificial intelligence creates a risk that students will use it to obtain ready-made answers, which may weaken independent thinking. To prevent this, learning tasks should be designed so that artificial intelligence acts as a partner in the creative process rather than a substitute for it. For example, students may be asked to critically evaluate and improve a text or solution generated by artificial intelligence, compare several alternative approaches, or justify their own choice. Project-based and problem-based learning, research assignments and teamwork in a digital environment contribute to the development of students' critical thinking, initiative and responsibility for the results of their work [14; 15].

Conclusion

The analysis shows that the development of students' professional qualities by means of artificial intelligence and digital technologies is not ensured automatically by the mere introduction of technical tools into the educational process. Its effectiveness depends on the creation of a set of interrelated pedagogical conditions: (1) teachers and students possess the skills to work with large, constantly updated data arrays; (2) digital technologies are integrated with traditional teaching tools in a didactically appropriate way; (3) positive learning motivation is formed on the basis of the diversity of digital technologies; (4) students' individual characteristics are taken into account through adaptive and personalized learning; and (5) students' creative activity is stimulated through the purposeful use of artificial intelligence tools.

These conditions should be implemented as a system, since each of them reinforces the others. The leading role in this process belongs to the teacher, whose information culture and readiness to use artificial intelligence purposefully determine the quality of the educational outcome. The implementation of the identified conditions is consistent with the priorities of state policy in the field of digitalization and artificial intelligence in the Republic of Uzbekistan [1; 2]. Further research may focus on developing methodological recommendations and experimentally verifying the effectiveness of the proposed pedagogical conditions in the training of specialists at higher education institutions.

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