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## THE PHENOMENON OF “ARTIFICIAL INTELLIGENCE” IN THE FORMATION OF TRANSVERSAL COMPETENCIES OF THE FUTURE TEACHER: PROS AND CONS

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**Abstract.** This article updates the problem of professional training of the future teacher in the context of rethinking the education process, forming a system of knowledge, abilities and skills necessary for the professional competitiveness of the future specialist. An attempt was made to draw attention to the urgent need to modernize the educational process in the context of searching ways to effective adaptation of modern youth to the realities of the 21st century. The importance of the term “transversality”, which previously functioned in a highly specialized environment of mathematical sciences, is emphasized in order to explain its modern interpretation in the field of professional education. The rapid processes of globalization and the consequences of the fourth scientific and technical revolution 4.0 (since the middle of the 20th century), which encompassed the intellectual activity of mankind, contributed greatly to the informatization of society, highlighted the need to develop the ability to solve problems related to technological achievements and intercultural communication. A special role is assigned to the use of artificial intelligence (AI) in education and science; analyzed the research of Ukrainian and foreign scientists dedicated to the study of the processes of perception, understanding and use of artificial intelligence by a modern student. The positive and problematic aspects of the introduction of the capabilities of artificial intelligence in the educational process of higher education institutions are considered; impact of computerization on all spheres of social and economic life of society is proven. It was concluded that in modern education it is necessary to develop awareness and understanding of the complex nature of artificial intelligence, ethical norms of its application in the educational process; to form the skills of a conscious approach to determining the degree of effectiveness of the achievements of innovative processes.

**Keywords:** educational process, institutions of higher education, artificial intelligence, scientific and technical process, education seekers, transversal competences, international labor market, ethical norms.

### 1. INTRODUCTION

The beginning of the history of the phenomenon of artificial intelligence dates back to the fifties of the 20th century, when scientists Allen Newell and Herbert Simon created the first artificial intelligence computer program “Logic Theorist” (1955). The term “artificial intelligence” was first used by the American computer scientist, John McCarthy, a college associate professor, in his speech at the Dartmouth Conference (1956). The researcher, together with his associates, wanted to distinguish this branch of research from the already well-known “cybernetics”. The document called the Dartmouth Proposal is considered as fundamental to this field of research. Scientists emphasized the need for thorough research into neural networks, the theory of computability, creativity and natural language

processing. The documents, called the Dartmouth Proposal, are considered fundamental to this field of research. For the first time, scientists emphasized the need for consistent thorough research on neural networks, the theory of computability, natural language processing, and the creation of a base for voice recognition technology. The logical result of these plans was the founding of the Stanford Artificial Intelligence Laboratory (SAIL) in 1965 (Popova, et al., 2024, p. 334).

Now Artificial Intelligence (AI) is a branch of computer science that deals with the development of intelligent machines that can perform tasks that usually require the analysis of human cognitive processes and apply the patterns of the human brain to software development. Researcher Tuomi, I. in her report "The Impact of Artificial Intelligence on Learning, Teaching, and Education. Policies for the future" (2018) emphasizes that:

*"All human actions are based on anticipated futures. We cannot know the future because it does not exist yet, but we can use our current knowledge to imagine futures and make them happen. The better we understand the present and the history that has created it, the better we can understand the possibilities of the future. To appreciate the opportunities and challenges that artificial intelligence creates, we need both good understanding of what AI is today and what the future may bring when AI is widely used in the society"* (Tuomi, & Ilkka, 2018).

## 2. REVIEW OF THE LITERATURE, GENERALIZATION OF THE MAIN PROVISIONS

It is quite clear that the position of various scientists and researchers regarding the innovative phenomenon in the social and economic life of mankind cannot have a unanimous perception and approval. This is primarily determined by the economic development of each community and the history of development and traditions of the formation of the education system of each country in particular. The processes of globalization, rapid development of scientific and technical progress and computerization of all spheres of human activity comprehensively contributed to the search and development of new forms of technical support of the educational process in educational institutions. The issue of training future specialists in institutions of higher education is gaining particular importance in modern conditions.

Ways of forming transversal competences in the process the preparation of the future specialist, the current state of development of professional knowledge and forms of educational communication, the needs and challenges of the modern labor market actually determine the relevance of the search for optimal ways to modernize professional education at the current stage.

*"The process of improving all components of professional training and the development of new ways of forming the professional competence of a future teacher in higher education institutions of Ukraine have always been in the center of attention of scientists; the components of the training of future specialists for professional pedagogical activities substantiated in detail by researchers"* (Lipatov, et al., 2023, p. 56).

The relevance of the issue of the formation of transversal competence in the professional training of students of higher education institutions was considered in the scientific studies of Ukrainian scientists, namely: formation of transversal competences in the process of future primary school teachers' training (Matvienko, et al., 2022), the formation of transversal competences in the process of forming the professional identity of the future teacher (Olefrenko, 2022); formation of transversal competences in foreign language professional training of future teachers: regulatory and legislative aspects (Stepanenko, 2022); exemplification of the term "transversality" in the modern scientific space through the prism of training a future specialist (Popova, 2022).

The authors convincingly prove the relevance and urgent need for the formation of transversal competences, the need to adapt the process of professional training of the future teacher in accordance with modern European standards, guided by regulatory and legislative documents such as Key Competences for Lifelong Learning European Commission (EC) (2019) and others.

A special role is given to the educational work of the teacher in the formation of the foundations of transversal competences and the introduction of elements of artificial intelligence into the educational process. Junior school age is an effective stage for the development of appropriate personal competences, which will contribute to the establishment of a solid basis for their social and professional adaptation. The main type of activity of a junior high school student is the process of obtaining relevant knowledge, abilities and skills, accumulating information about the surrounding world, nature, interaction in society. Modern Ukrainian society, educational institutions should implement versatile education of the population, especially the young generation, regarding the problems of perception and application of media materials in their lives; forming a sufficient level of media literacy (Budnyk, Konovalchuk, Konovalchuk, I., et al., 2022).

The importance of the issue of the formation of media literacy of schoolchildren is actualized in state legislative documents, namely: Laws of Ukraine "On Education" (2017), Concept of State Policy Implementation in the Reform of General Secondary Education "New Ukrainian School" (2016), Decree of the President of Ukraine "On National Strategy for the Development of Education in Ukraine for the period until 2021" (2013), the State Standard of Primary Education (2018) and others. As emphasized in the Concept of Implementation of Media Education in Ukraine, edited by L. Naidionova and M. Sliusarevskyi (2016), "the priority areas of media education in the Ukrainian educational environment are its implementation in all components of the continuous education system in Ukraine (media education in preschool, school, extra-curricular, media education in higher education, media education by means of media)" (Naidionova, et al., 2016, pp. 14-15).

The above-mentioned document states that "the main principles of media education can be called the following:

- personal socio-psychological approach (taking into account current media needs, age, individual and socio-psychological characteristics of the individual);
- constant updating of the content of media education (according to the development of technologies, changes in the system of media culture of society);
- focus on the development of information and communication technologies (takes into account the development of the latest media);
- priority of moral and ethical values (aimed at the protection of public morality and human dignity, opposes cruelty and various forms of violence);
- respect for national traditions (aimed at the development of national culture);
- civil orientation (contributes to the development of civil society, relies on the potential of public associations and associations);
- aesthetic giftedness (uses the best achievements of various forms of modern art and aesthetic education by means of visual arts, music, fiction, cinema, folklore practices);
- productive motivation (emphasis on the creative perception of media and the development of the individual's ability to create his own media production are combined)" (Naidionova, & Sliusarevska, 2016, pp. 14-15).

Slow introduction of artificial intelligence capabilities into the educational process contributed to a new push in scientific research on the issue of professional training of the future specialist. which has become an integral feature of the modern life of the world community. It should be noted that special attention was also paid to the issue of media literacy of primary education students in the education process. Scientists V. Danylenko, V. Lipostanskyi, and V. Melezhik made a significant contribution to the history of the phenomenon of "media literacy of primary school students" in national education.

T. Ivanova, O. Volosheniuk, & V. Ivanov, who developed and organized the Educational Program "Media Literacy in Questions and Answers" (2014) and the Educational Program "Steps to Media Literacy" (Ivanov, a et al., 2014).

Scientists S. Tolochko & A. Godunova provided a versatile theoretical and methodological analysis of foreign practices of using artificial intelligence in education (Tolochko, 2023). It is no coincidence that

in the article by scientists O. Matvienko & L. Popova, a lot of attention is paid to the training of the future primary school teacher, because this stage of the formation of the personality of a junior high school student is extremely important. It is this age that contributes to the effective formation of transferable competences and the introduction of elements of artificial intelligence capabilities into the educational process. The authors emphasize that:

*"[...] The modern world is complex. It is not enough to only give a child the necessary knowledge. It is also necessary to teach how to use that knowledge. Currently, in global practice, the effectiveness of education is associated with the implementation of the competency approach. Competent learning outcomes of primary school students defined in the previous documents – the State Standard (2011), in the Requirements educational programs (2012), in the Requirements for monitoring and evaluating educational programs student achievements (2014). It should be noted that the 2011 standard mainly focused educators on the formation of subject competencies in elementary school students, thanks the newly created regulations are aimed at achieving the key ones"* (Matvienko, et al., 2022, p.228).

In their research sciences V. Lipatov (2023) & L. Stepanenko (2022) pay particular attention to the role of foreign language in the formation of transversal competencies in the professional training of the future teacher.

*"In our opinion, it is the formation of transversal skills in future primary school teachers (communication, multitasking, organization and time allocation, teamwork, creativity, critical thinking, leadership) that will contribute to their effective adaptation to modern requirements for future specialists in the labor market. It is very important to continue the idea of this through"* (Lipatov, 2023, pp. 234-235).

Additionally, it poses a necessity to improve teachers' special preparation and qualification to design educational environment that can guarantee the achievement of transversal competences as an educational outcome.

Scientists T. Olefirenko & L. Popova in their article "The formation of transversal competences in the process of forming the professional identity of the future teacher" pay special attention to the process of forming the professional identity of the future teacher. The authors emphasize that:

*"[...] it is the formation of the professional self-regulation of a modern teacher of the New Ukrainian School that correlates with the levels of his professional competence. A prominent place is occupied by the issue of determining the factors that influence the formation of the professional identity of future teachers in institutions of higher education through the prism of the formation of transversal competencies"* (Olefirenko, et al., 2022, p. 49).

According to English scientists, there are a number of positive advantages of using artificial intelligence in the training of students in institutions of higher education in England. Various programs based on artificial intelligence are able to synthesize and analyze a large amount of information on the effectiveness of student learning, store the obtained data and provide personalized recommendations (Hengameh Karimi, Sarwar Khawaja).

Scientists Lai T., Zeng X., Xu B. et al. think that there are five typical ways of applying artificial intelligence in the educational process, such as: 1. Intelligent educational environment. Creating an educational environment that uses artificial intelligence to adapt to the needs and abilities of learners. 2. Intellectual support of the learning process. Using AI to provide personalized support and feedback to the learning process. 3. Intellectual educational assessment. The use of artificial intelligence to assess the knowledge and skills of customers of educational services and provide recommendations for further training. 4. Intellectual help for teachers. The use of artificial intelligence to assist teachers in planning lessons, evaluating the work of students and managing the team. 5. Intelligent educational management and services. Using artificial intelligence to manage educational systems and provide services such as recommendations for choosing courses and programs (Lai, & Zeng, 2023).

In their article, the researchers Alina Iorga Pisicab Tudor Edub Rodica Milena Zaharia and Razvan

Zaharia. (2023) consider the issue of introducing artificial intelligence into the curricula of higher education institutions in the Romanian context.

We consider it appropriate to analyze the ten potential research topics outlined by scientists Hwang G. J., Xie H., Wah B. W., & Gasevic D. (2022), which are of particular interest for the implementation of artificial intelligence in the educational process, namely: 1) development of learning models based on artificial intelligence (visual recognition, speech recognition, expert systems and natural language processing); 2) assessment of productivity and experience of education seekers who study with existing artificial intelligence systems; 3) research on the effectiveness of learning systems based on artificial intelligence from different points of view (for example, increasing the level of thinking of students, interactive or behavioral models, and cognitive load); 4) rethinking existing educational theories by considering different roles of artificial intelligence in education (namely, tutor, tutor, training instructor, etc.); 5) offering innovative learning or assessment strategies with the help of artificial intelligence (students will be able to review and resubmit reworked work after receiving review results and feedback from an artificial intelligence reviewer before the end of time); 6) reviewing how existing learning tools can be used in learning content using effective tools or strategies (eg, problem posing, gamification, peer assessment, progressive prompting, and voting); 7) big data analytics for large-scale data sources in educational systems and educational contexts. 8) development of large-scale learning systems: large-scale learning systems are aimed at facilitating high-quality learning for millions of students (for example, chatbots can provide instant feedback and support for many students' questions at the same time. Hardware devices: mobile tablets and virtual reality glasses - can additionally optimize the collection, integration, support and analysis of data in educational platforms; 9) development of ethical principles and practices for the use of artificial intelligence technologies in education can not only increase the effectiveness of learning and increase human intelligence during the educational process, but also cause potential ethical problems, such as -eg: digital hegemony in education, power relations between students, teachers and systems; 10) cooperation between man and artificial intelligence, because in many areas of human life many questions arise about the role of man and the relationship between man and artificial intelligence.

### 3. DISCUSSION

The change in the paradigm of higher education in Ukraine promotes the need to study ways of modernizing the system of professional training of future specialists; highlights the need for the formation of transversal skills, involving the innovative capabilities of artificial intelligence in modern conditions (Tsependa, & Budnyk, 2021).

The analysis of this issue by Ukrainian and foreign scientists is consistent with the general trends and results of research into the phenomenon of "artificial intelligence" presented in scientific and popular science literature. Unanimity of views in the interpretation of this multifaceted phenomenon is followed. The authors believe that the positive side of the introduction of artificial intelligence into the educational process of higher education institutions of the world community is that, as expected, artificial intelligence can serve as an indispensable assistant in education and scientific research, significantly saving the time of searching for a large amount of information; provides assistance in the translation of texts from different languages of the world, which allows access to international sources of information, cooperation with colleagues and dissemination of the results of own research, which can be contributed to international cooperation.

But in order to assess the opportunities and challenges created by artificial intelligence in modern conditions, it is necessary not only to understand well the essence of this phenomenon today, but also to make an attempt to predict what its use may bring in the future. On the one hand, this can increase the differences in skills and contribute to the growth of the competitiveness of the future specialist, but at the same time, it can reduce the quality of knowledge (when the student will completely rely on the

authority of artificial intelligence and lose the ability to critically evaluate the information received) and level the opportunities for manifestation of individuality. The use of artificial intelligence in education can shape how learning happens, and it can change the way learning is assessed. This can force students to adapt to the demands of technology, depriving people of agency and opportunities for responsible action. The most popular artificial intelligence tools among education seekers today are *ChatGPT* and the international services *Grammarly*, *Bard Google*, *Midjourney*, *Notion AI* and *Stable Diffusion*. But despite this, it cannot influence purely human qualities (altruism, kindness, morality, loyalty, empathy). In our opinion, the task of educational institutions is to find a harmonious balance for the integration of artificial intelligence into education, which will improve learning, but does not negate the basic humane features of education.

#### 4. CONCLUSION

The theoretical analysis of modern Ukrainian and foreign scientific researches on the problem of the formation of transversal competences in the process of training future specialists, the influential role of artificial intelligence on the educational process of professional training of the future teacher, proved the actual significance of this phenomenon, its importance for the training of a competitive specialist.

In our opinion, transversal competence is not only a set of certain knowledge and skills. The presence of this phenomenon in the professional training of the future teacher implies the unification of the nature of competence, the ability to meet the complex requirements of the time, the needs of society, involving and mobilizing internal human resources (adaptability; motivation, the ability to implement the acquired knowledge, the ability to self-improvement and analysis of international experience, psychological readiness for innovation).

We consider that the use of artificial intelligence in many areas of our lives is growing every day, which is confirmed by the results of various studies. In institutions of higher education, it acts as an auxiliary tool for supporting the teaching and learning process. But it should be noted that it is necessary to be very moderate in its multifaceted implementation. Simplifying the educational process for a modern student when using various technical innovations should not stop his own personal development, the formation of his own professional skills and moral qualities.

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майбутнього вчителя: за і проти. *Журнал Прикарпатського університету імені Василя Стефаника*, 11 (1) (2024), 86-93.

У статті актуалізується проблема професійної підготовки майбутнього вчителя у контексті переосмислення процесу освіти, формування системи знань, умінь і навичок, необхідних для професійної конкурентоспроможності майбутнього фахівця. Зроблено спробу привернути увагу до нагальної потреби модернізації освітнього процесу в умовах пошуків шляхів ефективної адаптації сучасної молоді до реалій XXI століття. Підкреслено значущість терміну "трансверсальність", який раніше функціонував у вузькоспеціалізованому середовищі математичних наук, щоб пояснити його сучасну інтерпретацію в галузі професійної освіти. Стрімкі процеси глобалізації та наслідки четвертої науково-технічної революції (з середини XX століття), яка охопила інтелектуальну діяльність людства, сприяли інформатизації суспільства, виокремили потребу розвивати здатність до розв'язання проблем, пов'язаних з технологічними досягненнями та міжкультурною комунікацією. Особлива роль відводиться використанню штучного інтелекту в освіті та науці; проаналізовано дослідження українських і зарубіжних учених, присвячених дослідженню процесів сприйняття, розуміння та використання штучного інтелекту сучасним студентом. Розглянуто позитивні та проблемні аспекти запровадження можливостей штучного інтелекту в навчальному процесі закладів вищої освіти; вплив комп'ютеризації на всі сфери соціального та економічного життя суспільства; зроблено висновок, що в сучасній освіті необхідно розвивати усвідомлення та розуміння складної природи штучного інтелекту, етичних норм його застосування в освітньому процесі; формувати навички свідомого підходу до визначення ступеня ефективності здобутків інноваційних процесів.

**Ключові слова:** навчальний процес, заклади вищої освіти, штучний інтелект, науково-технічний процес, здобувачі освіти, трансверсальні компетентності, міжнародний ринок праці, етичні норми.