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ARTIFICIAL INTELLIGENCE AS A MEANS OF DEVELOPING CREATIVITY IN FUTURE TECHNOLOGY TEACHERS

Abstract. The article considers and analyzes the possibilities of using artificial intelligence (CatGPT, AI) in the training of future specialists, namely for the development of creativity in future technology teachers. The key aspects that should be taken into account and used for the development of creativity are identified, and possible disadvantages of this innovative technology are noted. The rapid development of artificial intelligence has burst into almost all spheres of life, we focused on the use of some AI tools in the training of future technology teachers and the development of their creativity. We analyzed several approaches to using CatGPT to facilitate the organization of classes. Such as: idea generation, scenario building, storytelling and role-playing, problem-solving exercises, creative writing and documentation, interactive learning modules, individual learning paths, innovative challenges that help future teachers gain practical experience and adapt faster to the modern requirements of pedagogical practice. In the article, we offer several working tools from our own "piggy bank" and the principles of their use. The article highlights the current state of AI use in the educational environment and provides recommendations for practicing teachers on the effective use of artificial intelligence technologies. We are convinced that the use of artificial intelligence in the development of creativity of future technology teachers has an important impact on the personal development of creative potential. By using artificial intelligence, we can ensure the active participation of students in the learning process. AI tools stimulate curiosity, promote active research, experimentation, and problem solving. However, along with the great opportunities for using artificial intelligence, there are also threats such as the loss of the human factor, the dissemination of personal data, and financial losses. Therefore, for a good result in the development of creativity of future technology teachers, it is necessary to take into account all the advantages and disadvantages of using AI using strategies balanced between opportunities and challenges.

Keywords. Artificial intelligence, artificial intelligence in the educational environment, training of future technology teachers, creativity development, AI tools, ChatGPT.

Problem statement

Since 2022, education in Ukraine has been focused on Education 4.0, in accordance with the Great Transformation program "Education 4.0: Ukrainian Dawn", which involves the use of advanced technologies to improve learning and prepare for lifelong learning in the digital world. The program is based on the principles of adaptability, individualism, collaboration, and advanced education [1]. In order to achieve Education 4.0, it is necessary to provide students with access to modern technologies and the appropriate infrastructure for their use and pedagogical support. The main component of Education 4.0 is digital humanistic pedagogy, which is based on the latest digital technologies in physical and virtual reality [2].

According to V. Bykov, the current pace of development and improvement of computer technologies requires the purposeful formation of a modern information and educational environment [3, p. 9]. Doctor of Pedagogical Sciences, Professor, Chief Researcher of the Department of Higher Education and Labor Market Interaction of the Institute of Higher Education of the National Academy of Pedagogical Sciences of Ukraine O. Otych, who raised this issue at the seminar "Formation of Innovative Infrastructure of Educational Institutions: Theoretical Foundations and European Experience", is convinced of the relevance of this issue. She is convinced that the innovative infrastructure of universities is the basis of their innovative potential, which will enable our country not only to restore the potential lost during the war, but to make it better. We agree with this opinion and strive to be at the level of successful European countries.

The Concept for the Development of Artificial Intelligence in Ukraine, approved in 2021, was a stimulating event for the development of artificial intelligence in the educational environment of Ukraine [4].

In February 2023, ChatGPT (AI) burst into the lives of Ukrainians exponentially - a new chatbot developed by the artificial intelligence company OpenAI that can be accessed by any user. Artificial intelligence is smoothly penetrating all spheres of our lives, and we will focus on the use of artificial intelligence in education, namely to develop the creativity of future technology teachers.

In their research on the use of AI in higher education institutions, I. Drach, O. Petroe, O. Borodienko, and I. Regeilo state that "The broad opportunities and prospects for the use of AI in education can be traced to the transformation of the educational process into a more innovative, inclusive, efficient, and effective one through the introduction of new high-quality teaching methods that are fast, personalized, and student-centered. The real goal of AI in educational systems should be to maximize the individualization of education by offering students personalized learning paths according to their strengths and weaknesses and didactic material adapted to their characteristics, while maintaining the quality of education and the integrative principle of educational systems" [5, p.72]. We support this opinion and believe that artificial intelligence is not a competitor to a teacher, but a reliable assistant that can achieve great success in work, simplify routine tasks, and free up time for creativity.

Analysis of recent research

The active use of AI in various fields of activity has prompted many researchers and scholars to study the impact of artificial intelligence on the educational space. The use of artificial intelligence in educational institutions is considered in the works of Ukrainian and foreign scientists, researchers and practitioners who have made a significant contribution to the development of ways to apply artificial intelligence in scientific research on a global scale T. Corbett (Т. Корбет) is an associate professor of human-computer interaction, developed an algorithm for knowledge assessment (2011-2012), C. Baumer (С. Баумер), a young scientist in design based on interactive language technologies, also in Ukraine V. Bykov, M. Leshchenko, L. Tymchuk, I. Kucherak M. Klymenko, O. Konoval, N. Martyniuk, L. Polyakova, S. Semerikov, V. Tereshchenko, O. Furman. Ukrainian scientists O. Lokshyna, O. Glushko, and M. Tymenko (2018) studied the development of digitalization of school education in Ukraine on the way to European integration. O. Dushchenko (2021) analyzes the concept of "digital transformation of education", describes the current state of digital transformation of education and systematizes the experience of scientists in the use of digital technologies in the educational process [6]. A. Kolomiets and O. Kushnir analyzed the opportunities and threats of using artificial intelligence in the training of future teachers [7]. Their research and publications contribute to the expansion of scientific knowledge and the application of advanced technologies to achieve new heights in the use of AI.

The purpose of the article

To reveal the role of ChatGPT in the modern educational environment, to identify the key aspects that should be taken into account and used in the context of using AI capabilities in the development of creativity of future technology teachers.

Given that future teachers, namely, labor education teachers, face a number of new tasks and requirements for the implementation of state content standards in the educational field of "Technology" in general education institutions, the requirements for creative, creative abilities of the teacher's personality are changing. In our opinion, it is the developed creative potential of the personality of a labor education teacher that will be able to create educational conditions for the implementation of creative educational activities of students. In the process of training future labor training teachers, the effective use of AI will contribute to the improvement and development of the creative potential of the individual.

Technology, as an academic subject, plays an important role in shaping a student's creativity, developing their abilities and talents, and worldview.

"Technology" as a subject is aimed at forming various personal competencies that will be useful both in personal life and in

further professional activities. Namely, the formation of technical culture, which includes knowledge of basic technological processes, skills in working with tools, materials and equipment, as well as the ability to apply them in various life situations. It also helps in choosing a future profession and helps to master modern technologies, including computer modeling, robotics, 3D printing, and electronics. This will help develop creative abilities and stimulate interest in technical creativity and innovation.

According to O. Chumak, the modern paradigm of the educational process of the XXI century is innovative [8], according to which the most important thing is the development of creative abilities, students' readiness for lifelong learning, which will help to adapt to changes in society. 3 In view of this, society dictates high requirements for future technology teachers, where it is necessary not only to convey the basic material, but also to engage the participants of the educational process in the creative process of cognition. This requires a creative approach to the organization of the educational process, especially in the choice of methods, means and forms of teaching.

After conducting a small study, we are convinced that the growing complexity of educational programs and increasing demands of students determine the need to introduce new pedagogical technologies into the educational process and improve the methodology of teaching "Technologies". Outdated approaches to teaching "Technologies" do not stimulate the participants of the educational process to actively perceive the educational material, do not develop creative thinking and imagination, do not form skills of working with additional sources of information, so it is important to use modern technologies for learning.

With the development of information technology, the amount of information that needs to be systematized and distinguished between useful and reliable information has increased, which prompts the need to improve active learning methods. New methodological guidelines for teaching are relevant, based on innovative technologies, non-standard schemes for studying program material; interesting presentation of factual material; saturation of the presentation of material with additional didactic material: diagrams, flow charts, illustrative material; free space for initiative and creativity.

We believe that it is innovative technologies that create positive conditions for improving and activating the mental activity of future teachers, forming their creative personality, and developing their intellectual potential. 3 In view of this, one of the main principles of creativity development should be an individual development system that organically combines traditional and innovative forms and methods of organizing the educational process.

To facilitate the organization of such classes, we can use ChatGPT. Here are some approaches to using it:

Generating ideas. We suggest using ChatGPT to create a list of creative ideas related to a specific topic. This may inspire participants to come up with their own ideas. At the same time, don't forget to encourage participants to enter keywords or phrases related to the topic and use AI to expand on these concepts.

Scenario building. We start by creating real-world scenarios related to a specific topic. ChatGPT can help expand and improve these scenarios by making them more complex. Using AI to model different situations, we can ask participants to come up with innovative solutions.

Storytelling and role-playing games. We create stories or scenarios using ChatGPT, and then invite participants to add vivid details and creative elements to certain stories using artificial intelligence.

Problem-solving exercises. We present real or hypothetical problems in the context of the proposed topic and invite participants to use ChatGPT to find creative solutions. Together, we explore different approaches and perspectives for various problem-solving strategies.

Creative writing and documentation. It is advisable to integrate ChatGPT into writing exercises by asking participants to write creative reports, project proposals, or documentation related to their assignment. Remember to encourage the use of creative

language and innovative ideas for effective communication.

Interactive training modules. We use ChatGPT capabilities to create interactive training modules and tests that engage participants in active learning.

Customized learning paths. We analyze individual learning styles and preferences, and then create personalized learning materials or suggestions tailored to each participant's creative strengths and areas for improvement.

Innovation challenges. We organize periodic innovation challenges where participants use artificial intelligence to develop and present creative solutions to specific problems or tasks related to the proposed activity.

The main advice is to remember to provide clear instructions on how to use AI effectively and to guide learners to incorporate the created content into their learning experience. In addition, we make sure that the emphasis remains on practical application and real-world relevance to improve the overall effectiveness of learning. However, it should be borne in mind that a prerequisite for the development of creativity is self-knowledge and the search for an individual style of activity based on psychophysiological characteristics, including: the speed of inclusion in work, the duration of performance, the conditions necessary for the awakening and flow of creativity. In general, creativity can be defined as a set of intellectual and personal characteristics that allow you to act productively in situations of novelty, uncertainty, lack of complete initial data and a clear algorithm for solving a problem. From the above, we can conclude that the conditions for the development of creative qualities of future technology teachers are: lack of regulation of subject activity; existence of a positive example of creative behavior; creation of conditions for imitation of creative behavior; social reinforcement of creativity. The thesis about the positive influence of the environment on the development of creativity is important, so the appropriate reorganization of the educational process becomes an urgent pedagogical task.

In the modern Internet space, there are many artificial intelligence tools that could help and complement the interest of participants in the educational process. We can "collect" AI tools to get interested in learning and facilitate the organization of our work.

Let's define the main characteristics of such tools:

– easy to use;

– mostly in English, but there are many in Ukrainian;

– free or shareware;

– are constantly being improved.

From our own experience, we are convinced that it is possible to get "lost" in the abundance of auxiliary platforms, so we recommend having your own "piggy bank". Here are a few tools from our own toolbox.

To make it easier for teachers to prepare for classes and make them more interesting and dynamic, the team of the Na Urokom educational project created the Personal Assistant of the Modern Teacher. It consists of a set of innovative tools based on artificial intelligence that helps optimize the daily work of teachers. Here, a teacher can use many interesting tools effortlessly. The personal assistant offers a variety of interesting tasks and exercises, presentations, tables, flashcards, and effective knowledge control through tests. All of this can be customized by the teacher to fit their lesson, a relevant topic with interesting facts and convincing arguments for the importance of certain information for students.

On the platform https://uk.padlet.com, we can project an image of a product, combine the image with another object or image and see the product we would like to make, project a 3D image. In Figure 1, we offer to review the proposed version of making a feeder from certain materials.

It is worth noting that some material in textbooks is presented too complicated and here we can use the resource (https://eli5.gg/):

– explain in simple words;

– paraphrase;

– communicate with AI chat (with prominent figures of the past, fictional characters, heroes of fiction and movies, astrologers, psychologists...);

– create a text based on keywords.

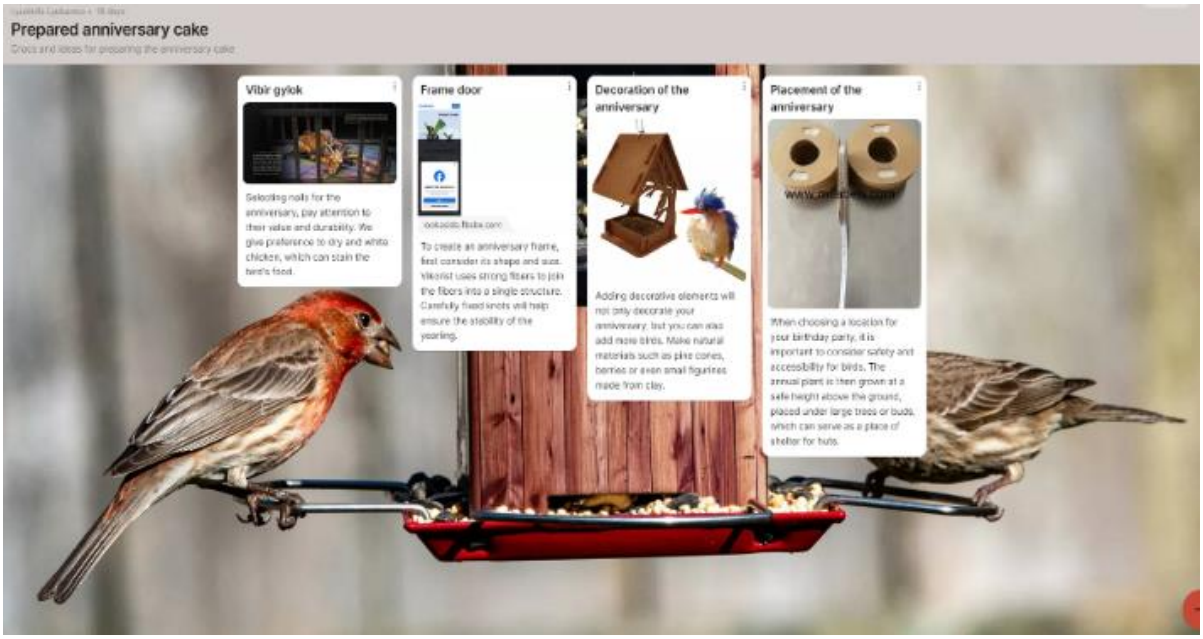

Fig. 1. Making a feeder

In Figure 2, we can see a variant of explanation of what a mind map is.

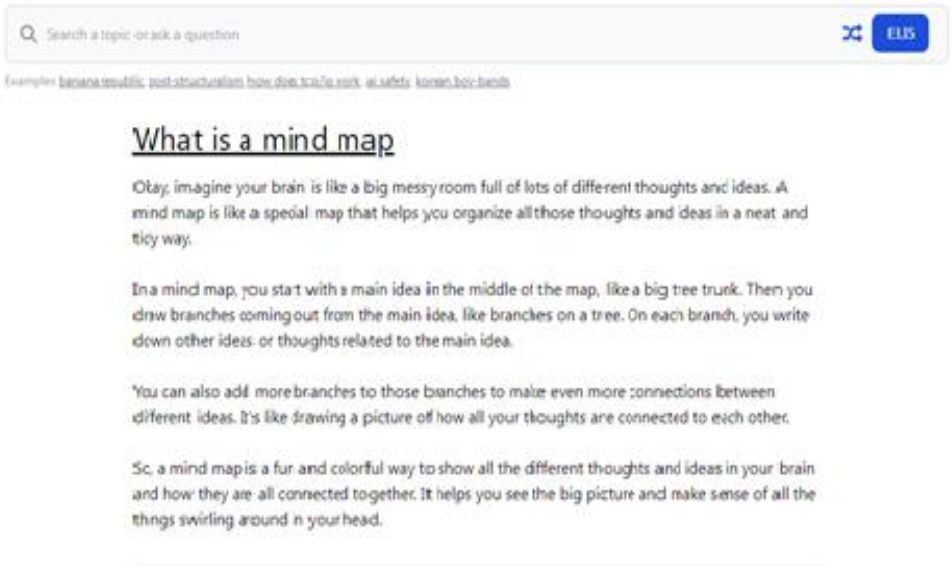

Fig. 2. A variant of the term explanation

At https://chatmind.tech/ru/editor, we can create flash cards, mind maps, conceptual research boards, lesson notes, educational games, quizzes, tests, questionnaires, tables of various types, electronic presentations, math problems, science experiments, STEAM projects, information search and systematization.

In Figure 3, we can see an AI-designed intelligence map for making a photo frame with your own hands, where you can change and specify the types of materials and tools.

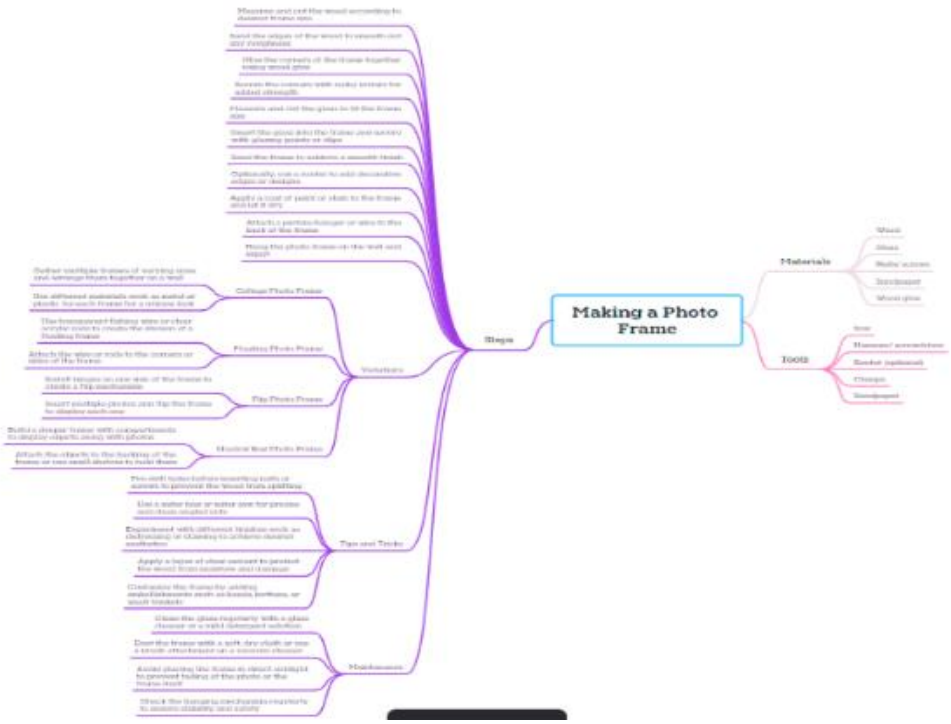

Fig. 3. Intelligent map "Making a photo frame"

Thus, using AI-assisted tools, we can not only create tasks or find interesting information, but also develop integrated projects that would require students to solve specific problems they face in real life. The principles of human-centeredness, practical orientation, integration, creativity, cooperation, and mutual respect should be the main ones in the development of such projects [9, p. 5].

There are several reasons why interactive technologies play an important role in developing the creativity of future technology teachers. First of all, by using artificial intelligence, we can ensure active participation of students in the learning process. AI tools stimulate curiosity, promote active research, experimentation, and problem solving. This contributes to deeper learning and increased motivation to study. In addition, interactive technologies help to transform abstract and complex information into a more understandable and accessible form. Thanks to visualization, simulations, virtual laboratories, 3D images, and other interactive tools, students can see, hear, and interact with the learning material, which makes it easier to understand [10].

Therefore, we can conclude that the use of artificial intelligence to develop the creativity of future technology teachers plays an important role in encouraging students to think critically, analyze and evaluate information. It is AI that enables students to solve problems, make decisions, and solve tasks in real or virtual situations, which contributes to the development of their critical and creative potential. One of the key opportunities for using AI is individualized learning. This technology makes it possible to create curricula that take into account the individual needs and level of training of each student, which allows them to study the material at their own pace, ensuring more efficient knowledge acquisition. In addition, AI allows analyzing student performance and identifying those who need additional support. This contributes to more efficient work of teachers and helps to improve the overall level of education.

However, the possibilities of artificial intelligence also pose threats. It is important to note that the excessive use of technology can lead to the loss of the human factor in education. Teacher training involves interaction and communication, and it is important to maintain this aspect in the learning process. Data privacy and inequality of access are also serious issues that need to be addressed when introducing AI into the

educational process. Financial costs and security measures should also be considered and appropriate strategies developed.

The general idea is that AI is becoming a very important tool in the educational environment, which can significantly improve the level and effectiveness of learning and achieve the desired result. However, in order to focus on developing creativity and achieve the desired result, it is important to assess all possible consequences and risks. It is necessary to develop strategies that would balance the opportunities and challenges associated with artificial intelligence in education, namely, in the training of future technology professionals.

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