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## ARTIFICIAL INTELLIGENCE TOOLS IN TEACHING SOCIAL AND HUMANITARIAN DISCIPLINES

**Abstract.** Due to the rapid development of information technologies, the use of digital solutions for educational purposes is becoming increasingly relevant and promising. This encourages the evaluation and development of new methods that provide a personalized approach to teaching and learning, including integration of artificial intelligence (AI) tools that can revolutionize education. However, the question of teachers' qualifications regarding the use of AI tools in their pedagogical activities, especially in social and humanitarian disciplines, remains unexplored. Therefore, the research goal is to investigate the level of competence of teachers of social and humanitarian disciplines when using AI tools in educational activities which involves educating users about the capabilities, limitations and proper use of these tools, understanding how to benefit from AI and how to avoid misuse.

The article reveals the advantages and challenges of applying AI tools, and provides an analysis of some specifics when implementing various AI tools in social and humanitarian disciplines.

During the pedagogical experiment, the authors did not limit themselves to the use of the ChatGPT tool; the teachers had an opportunity to explore the features of a number of AI tools that contribute to lesson planning, and generate visual content, text materials, and tasks for them. The expediency of using various AI tools was experimentally verified. Advantages and significant disadvantages as well as subject nuances were determined in practice. In addition, the authors found out the current level of competence of teachers of social and humanitarian disciplines. At the control stage, the authors analysed and summarized the dynamics of the levels of formation of the indicators of teachers' competence like awareness of the use of AI tools in educational activities; flexibility and ability to adapt when working with AI tools; assessment of confidence when implementing AI tools in educational activities.

The conclusions emphasize both the need for further study of the issues of using the educational potential of AI tools and the development of teachers' digital competence, as well as the formation of a conscious understanding of the risks and limitations in this area by students and teachers.

**Keywords:** artificial intelligence (AI); social and humanitarian discipline; teacher professional development; competence; educational activity.

## 1. INTRODUCTION

**The problem statement.** Information and communication technologies (ICT) affect people's daily lives in many areas: at work, at school, for communication, receiving news, entertaining, interacting with authorities, paying bills, or shopping online. Although the Internet is an almost permanent part of many people's lives, some people still feel a tangible distance from it, to a greater or lesser extent, which leads to the so-called "digital divide". Access to ICT is considered to be fundamental to improving productivity and competitiveness. Digital solutions can enrich our lives in many ways, but the benefits arising from digital technologies do not come without risks [1].

Despite the global increase in Internet users (64.4%, which is 1.9% more than in 2022) and the growing average time spent online (almost 7 hours a day, including 60 % on social networks, up 3% from 2022), only 38.3% prioritize education and learning-related goals in their online activities, 23.8% of respondents use a variety of websites and educational applications [2].

Nevertheless, in recent decades, education has been constantly transforming: traditional blackboards and textbooks have been replaced with interactive digital platforms; computers, the Internet, and social networks [3] have become an integral part of education, changing the way of teaching and learning; the use of artificial intelligence (AI) in education is becoming an increasingly relevant and promising direction, which opens up new opportunities for improving the quality of education and student engagement. AI's ability to revolutionize industries and solve complex problems enables the development of innovative teaching methods, personalized learning experiences, and automation of educational processes.

Generative AI is ushering in a new era where machines can generate accurate content and ideas in simple everyday language almost instantly. According to a survey conducted by Forbes, the most popular ways of using AI were creating an email (31%), preparing for an interview (30%), writing posts on social networks (25%), etc. [4].

The Accenture report identifies an increase in profit share in every industry by 2035, comparing a baseline without AI to expected profits with AI. Among all industries, education ranks first in the use of AI (84%) [5].

Due to the rapid development of ICT, emerging digital solutions for educational purposes are becoming increasingly relevant and promising, prompting the assessment and development of new methods to ensure personalized training and automation of many aspects of the educational process. AI systems are capable of revolutionizing various industries, providing

opportunities to solve complex problems and promote an innovative approach to education. As technology continues to shape the education landscape, it is critical for educators to adapt and leverage AI tools to effectively navigate this evolving field. By staying abreast of AI advances and integrating them into their teaching practices, educators could discover new dimensions of student engagement, creativity, and academic achievement as well as improve their skills and competencies needed to thrive in the digital age. Thus, the integration of AI in education highlights the urgent need for educators to proactively master these transformative technologies to fulfill their vital role in shaping the future of learning.

**Analysis of recent studies and publications** shows that researchers have already covered a wide thematic spectrum of AI applications: from institutional policies for AI use to successful practices of its implementation in distance learning.

L. Chen, P. Chen, and Z. Lin confirmed the widespread use of AI in education, particularly by educational institutions, in various forms; through the use of machine learning and adaptability, it allowed customizing and personalizing curricula according to the student's needs, which contributed to increasing their interest and knowledge retention, thereby improving the experience and overall quality of education [6].

D. Baidoo-anu and L. Owusu Ansah note AI potential to facilitate personalized and interactive learning, its role in creating tasks for formative assessment and providing continuous feedback for effective learning. However, researchers also emphasize certain limitations associated with AI (like ChatGPT), for example, the possibility of generating inaccurate information, the likelihood of bias, etc. [7].

S. Podlasov and O. Matviychuk studied the use of ChatGPT in teaching physics of technical university bachelors and came to the conclusion that it does not have a sufficient level of knowledge necessary for effective assistance to teachers and students in the field of physics and engineering. The researchers have emphasized the inadequacy of AI answers to complex questions, so they suggest its use in the field of natural sciences to stimulate critical thinking among students, paying attention to the formulation of tasks and their compliance with the LMS Moodle functionality [8].

However, Y. Sisilitsyn and V. Osadchyi analysed in detail modern scientific studies related to the use of AI and chatbots in higher education institutions. The researchers concluded that the use of ChatGPT might be promising when teaching programming for computer science students. Although, they state the need for further study and improvement regarding privacy issues, and determine directions for improving the educational process based on the use of ChatGPT and other AI technologies [9].

Y. Shchavinsky, T. Muzhanova, Y. Yakymenko and M. Zaporozhchenko emphasize the importance of improving the situational learning method to form students' cyber security competencies and suggest the use of the ChatGPT language model for creating learning situations and options for resolving conflict situations, promoting the development of problem-solving skills in the field of cyber security [10].

O. Spivakovsky, S. Omelchuk, V. Kobets, N. Valko and D. Malchykova consider the impact of AI on the educational process and scientific work of students, teachers, researchers and administrators of higher education institutions, and emphasize the need to develop institutional policies that will allow the academic community to determine the appropriate scope of AI application in the educational process and prevent the use of AI in areas where ethical norms are violated [11].

I. Tsidylo and C. Esteve Sendra conducted an overview of AI tools, focusing on Midjourney, and analysed in detail its capabilities in the context of training future designers. The researchers noted that Midjourney encourages outside-the-box thinking and empowers future design professionals with advanced instruction for formulating image prompts [12].

In his research, A. Alenezi analysed the opinions and experiences of teachers regarding the impact of AI-powered gamification on student motivation, engagement, and learning outcomes. The researcher emphasized that with the help of AI-based gamification, learning could be made exciting by developing student autonomy and providing real-time feedback, which might contribute to improving learning outcomes, deeper understanding of educational content, and developing problem-solving skills [13].

Also, scientists have already investigated the issue of using AI in teaching and learning foreign languages in secondary and higher education institutions [14]. Currently, AI tools, for example, ChatGPT, are actively used in practical activities when teaching foreign languages [15], professional language training for future teachers of foreign languages, opening up new opportunities to activate the interactivity of the educational process regarding mixed, remote and independent mastering languages [16]; the expediency and effectiveness of using AI tools has also been studied when implementing computer-aided translation (CAT) [17].

In turn, Z. Ali emphasizes the effectiveness of implementing AI tools with the flipped-classroom approach for language learning, which contributes to increasing students' competence and productivity [18].

Given the growing popularity of chatbots as virtual AI assistants [19], N. Haristiani studied the potential of AI chatbots in the context of foreign language learning. The researcher noted their effectiveness when developing students' confidence when communicating in a foreign language [20]. J. Kannan and P. Munday investigated new trends in learning and teaching a foreign language through the use of ICT, network learning and AI; they noted their effectiveness, first of all, in terms of the formation of student autonomy [21].

Thus, we observe scientists' significant interest in studying the potential of AI, particularly in educational activities. It is emphasized that such technologies contribute to the formation of student autonomy, expand the possibilities of thinking and contribute to the development of problem-solving skills. However, the question of the readiness and qualification of teachers, in particular of social and humanitarian disciplines, regarding the implementation of AI tools in their teaching activities has been left out of consideration, therefore **the research goal** of the article is to investigate the level of competence of teachers of social and humanitarian disciplines when using AI tools in educational activities, which involves educating users about the capabilities, limitations and proper use of these tools, understanding how to benefit from AI and how to avoid misuse.

To achieve the goal, the following tasks were set: 1) to find out the current level of competence of teachers of social and humanitarian disciplines when using AI tools in educational activities; 2) to verify experimentally the expediency of using AI tools in educational activities in the context of teaching social and humanitarian disciplines.

## 2. RESEARCH METHODS

To conduct a comprehensive study on the integration of AI instruments into teaching, we used the mixed research design based on quantitative (pedagogical experiment; hypothesis testing) and qualitative (informal oral interview before and after the experiment; conducting a survey with open-ended questions; comparison and generalization of pedagogical experience on the research problem; analysis of the data collected in a statistically valid manner) methods. At the ascertainment stage of the pedagogical experiment, we conducted a questionnaire survey of 82 teachers of social and humanitarian disciplines of secondary and higher education institutions regarding the use of AI tools in teaching and educational activities in order to find out the level of their competence when using AI tools according to the specified indicators. The formative stage of the pedagogical experiment on the implementation of AI tools in teaching activities included work in synchronous (taking a one-week teacher professional development

course elaborated by the scientific and pedagogical staff of the Communal Institution of Higher Education “Dnipro Academy of Continuing Education” of Dnipropetrovsk Regional Council”, Kryvyi Rih Educational and Scientific Institute of Donetsk State University of Internal Affairs and National Technical University of Ukraine “Igor Sikorsky Kyiv Polytechnic Institute”) and asynchronous (implementing the acquired knowledge and skills in practical activities, working with materials on the Google Classroom platform, participating in a forum for discussing results and sharing experiences, etc.) modes. At the control stage, a repeated questionnaire survey was conducted among the teachers in order to find out the quantitative and qualitative changes according to the determined indicators, and their quantitative values were established using the method of mathematical statistics.

The presented research results were carried out within the scope of the research work of the Department of Social and Humanitarian Disciplines on the topic “Personality in the educational environment of modern society” (state registration number 0123U104510).. The research results in the article are presented through the collective contribution of individual authors: the idea and preparation of the article project (A. Kyrpa); justification of the research relevance (A. Kyrpa); analysis of international experience of using AI tools in educational activities (A. Kyrpa, O. Stepanenko, V. Zinchenko); selection of AI tools and analysis of their functionality (A. Kyrpa, I. Karpan, V. Zinchenko); research methodology, structure of a pedagogical experiment (A. Kyrpa); development and description of indicators and levels of competence of teachers of social and humanitarian disciplines when using AI tools in educational activities (O. Stepanenko, V. Zinchenko, T. Datsiuk); development and implementation of a one-week course for teachers of social and humanitarian disciplines at the formative stage of the experiment (A. Kyrpa, O. Stepanenko, V. Zinchenko, T. Datsiuk, I. Karpan, N. Tilniak – according to the direction of professional training); support and description of asynchronous work of teachers of social and humanitarian disciplines (A. Kyrpa, O. Stepanenko, I. Karpan); interpretation and analysis of survey data (A. Kyrpa, T. Datsiuk, N. Tilniak, O. Stepanenko).

### 3. THE RESULTS AND DISCUSSION

AI has made significant strides since its inception in the 1950s.

Initially, A. Turing introduced the renowned Turing Test to assess machines’ thinking capabilities. In the 1980s, AI began to be applied in language learning through Intelligent Tutoring Systems (ITS). Fast forward to 2016, major tech giants like Amazon, Google, IBM, Facebook, and Microsoft formed collaborations in the realm of AI, aiming to benefit both people and society [21, p. 20-22]. Today, AI is a system that may become invisible for many human tasks, as its use will become commonplace, just like other technologies that are used in our daily lives [18, p. 1]. In education, the use of AI technologies, along with the use of ICT and online learning, is perceived as a new trend in the context of learning and teaching a second language [21, p. 20-22].

Merriam-Webster dictionary defines AI as “a branch of computer science dealing with the simulation of intelligent behaviour in computers; the capability of a machine to imitate intelligent human behaviour” [22]. The Encyclopaedia Britannica states, “AI is the ability of a digital computer or computer-controlled robot to perform tasks commonly associated with intelligent beings. Intelligent beings are considered to be those who can adapt to changing circumstances” [23].

In the Ukrainian Pedagogical Dictionary, AI is defined as a field of research, which is a set of various methods, techniques and means of analysing thinking processes to construct technical systems capable of performing actions that were traditionally considered the exclusive prerogative of the human brain [24, p. 369]. In the Philosophical Encyclopaedic Dictionary, AI

is the metaphorical name of one of the priority scientific directions, which has developed in the general complex of cybernetic research on modelling thinking processes, intensification of intellectual activity through computerization [25, p. 727].

Scientists state that the term “AI” denotes a scientific direction at the intersection of informatics, philosophy, cybernetics, psychology, mathematics, physics, chemistry, etc. This is a section of informatics and computer linguistics that studies the formalization of problems and tasks similar to actions performed by a person [17, p. 109].

According to B. Coppin, AI is the ability of machines to adapt to new situations, solve emergent tasks and problems, answer questions, develop plans and perform various other functions that require a certain level of intelligence that is usually inherent in humans [26, p. 4].

L. Chen, P. Chen, and Z. Lin in their study emphasize that AI is the result of the development of computers, related technologies, machines, and innovations in information technology that allow computers to perform functions similar to humans or close to them [6, p. 75265]. The scientists note the effectiveness of using AI in education in the context of performing administrative tasks (for example, providing feedback, data-driven work, determining the learning styles of students, etc.), providing instructions (for example, analysing and adapting educational programs, creating courses and individual curricula, etc.) and facilitating the educational process (for example, adjusting the course selection process for education seekers, predicting career development, etc.) [6, p. 75272].

J. Kannan and P. Munday investigated new trends in learning and teaching a foreign language through the use of ICT, network learning and AI and noted their effectiveness, first of all, in terms of the formation of student autonomy [21].

Thus, AI as a branch of computer science studies the development of systems and programs that can perform tasks that are usually considered intelligent for humans. The term covers a wide range of methods, technologies and research aimed at modelling human thinking and intellectual activity with the help of computers. AI attempts to create systems that can learn, understand, make decisions, and adapt to changing circumstances based on experiential learning.

In the context of teaching social and humanitarian disciplines (especially foreign languages) using AI tools, we can highlight the following advantages:

1. Personalization. AI tools can tailor the course to a learner’s individual needs. They adapt the content, pace and level of difficulty based on the progress and educational needs of every student.
2. Engagement. AI technologies offer a wide range of interactive and multimedia resources (for example, interactive games, multimedia content and virtual simulations) that motivate learners and involve them in active participation in the learning process, helping the teacher to reduce the affective filter in foreign language acquisition and to stimulate growth [27].
3. Instant feedback. Students can get immediate feedback with AI: whether it’s correcting grammar, practicing pronunciation, or expanding vocabulary, students can instantly learn from their mistakes.
4. Data-driven statistics. AI tools generate data about student performance that helps teachers identify gaps in student knowledge and adapt their teaching methods accordingly, which in turn promotes more effective learning.

AI is revolutionizing education by enabling personalized learning experiences, automating administrative tasks and offering instant feedback.

Also, E. Sabzalieva and A. Valentini suggested using AI tools as:

1. Socratic opponent. Students can use AI to prepare for discussions or debates, where it will act as an opponent and communicate with students on a given topic, helping them develop arguments.

2. Collaborative coach. Students can work together with the AI to complete group tasks and projects, where it acts as a “teammate” helping them explore and solve problems.
3. Personal tutor. Teachers can feed the AI information about students’ performance, and it provides personalized feedback on their progress and offers specific advice for further learning.
4. Study buddy. AI can create educational games and help students learn and understand foreign languages by providing interactive exercises and interpretation of information.
5. Motivator. Students can turn to AI for support during learning, receiving various games, exercises and tasks to improve their knowledge and skills.
6. Dynamic assessor. Students can discuss a topic with the AI and be graded on their level of knowledge and understanding.
7. Guide on the side. Teachers can use AI to create learning content, such as generating discussion questions, writing topics, and receive advice on how to improve a learning topic.
8. Co-designer. Teachers can refer to AI for curriculum updates, including new rubrics for assessment, ideas for improving accessibility, and recommendations for curriculum improvement, etc. [28, p. 9].

However, we would like to emphasize that, when introducing AI tools into educational activities when teaching social and humanitarian disciplines (in particular, foreign languages), we should also take into account:

- 1) the need to provide students with instructions on how to use AI tools (i.e., the teacher should conduct general navigation when using new tools, provide support to students during learning, and explain the value of technology on their educational path);
- 2) ensuring the integration of the curriculum (i.e., choosing certain AI tools to implement the set goals of the lesson, the teacher must agree on their expediency to ensure the effectiveness of the educational process);
- 3) conducting monitoring (i.e., the teacher should monitor the progress of students and, if necessary, provide students with additional support and feedback);
- 4) the importance of adaptation (i.e., if necessary, the teacher should adapt his/her teaching methods based on the data and ideas provided by the technology, which will ensure the flexibility of the educational process in accordance with the student’s educational needs).

In order to investigate the level of competence of teachers of social and humanitarian disciplines when using AI tools in educational and teaching activities, a pedagogical experiment was conducted.

At the beginning of 2023-2024 academic year, the authors of the article conducted the pedagogical experiment and involved 82 teachers of social and humanitarian disciplines of secondary and higher education institutions, who took teacher professional development courses elaborated by the scientific and pedagogical staff of the Communal Institution of Higher Education “Dnipro Academy of Continuing Education” of Dnipropetrovsk Regional Council”, Kryvyi Rih Educational and Scientific Institute of Donetsk State University of Internal Affairs and National Technical University of Ukraine “Igor Sikorsky Kyiv Polytechnic Institute”. We did not aim to limit the sample of participants, so teachers of different ages and professional categories were included.

During the pedagogical experiment on implementing AI tools in teaching and educational activities, the ascertaining stage was carried out. We determined the following indicators of competence of teachers of social and humanitarian disciplines when using AI tools in educational activities: awareness of the use of AI tools in educational activities; flexibility and ability to adapt when working with AI tools; assessment of confidence when implementing AI tools in educational activities.

The levels of formation of the determined indicators are basic, medium and high.

The basic level of competence of the teachers of social and humanitarian disciplines when using AI tools in educational activities involves absent or minimal knowledge and understanding of the limited functionality of one or several AI tools and their general capabilities when teaching; the ability to master new AI tools, but with support or assistance; a general understanding of the potential of AI tools, but with significant uncertainty or fear about the feasibility of their implementation or a lack of critical evaluation of AI-generated results.

According to the medium level of formation of the competence of using AI tools in educational activities, the teachers have a deeper understanding of concepts, know the main functions of 3-5 AI tools when teaching; they can explain the main ideas of using AI in their field; they are able to independently use and adapt AI tools when creating text and visual content for educational activities; they are more confident about using the potential of AI tools, they periodically subject AI-generated results to critical analysis.

At a high level of formation of competence of using AI tools in educational activities, the teachers have deep knowledge of the possibilities, limitations and potential of using AI in teaching and/or educational activities (in particular 5-6 tools), they are able to explain and argue the impact of AI on the educational process; they show flexibility, speed and independence in using various AI tools when creating text or visual content for educational activities; they are able to adapt to new technologies; they show moderation in the use of AI and subject all AI-generated results to critical analysis.

In order to identify the levels of the teachers' competence when using AI tools in educational activities for every indicator the ascertaining stage, we conducted a survey among the teachers of social and humanitarian disciplines, which consisted of the following questions:

1. To what extent are you familiar with AI tools?
2. What AI tools have you already tried when teaching?
3. What are the main reasons for using AI tools when teaching social and humanitarian disciplines?
4. What are your expectations regarding the possibilities of teaching social and humanitarian disciplines through the use of AI?

We only asked open-ended questions so as not to bias the teachers toward a certain opinion. Open-ended questions encourage reflection and description of proven experience.

We analysed the obtained results for every individual indicator of the competence of the teachers of social and humanitarian disciplines when using AI tools in educational activities at the ascertainment stage of the experiment (Fig. 1).

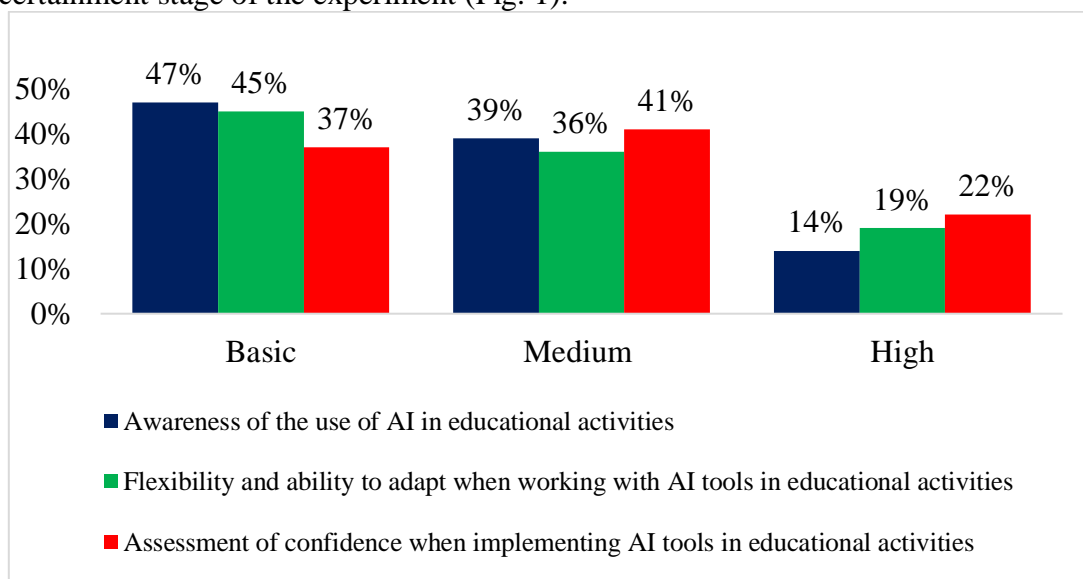


Figure 1. Levels of formation of the indicators at the ascertainment stage



Analysing the obtained data (Fig. 1), we observe that the majority of the teachers (87%) answered that they were familiar with the functionality of some AI tools and showed their awareness of using ChatGPT, Bard and Bing. It is worth noting that there were isolated mentions of the experience of using an extension for Google Slides called SlidesAI.io and designed to generate slides for a presentation on a given topic, according to a brief description or to the text of the speech, an extension for Chrome called Brisk Teaching which can be integrated in Google Docs, Classroom, Canvas, Schoology to adapt texts to the appropriate level of language competence of students or to identify the facts of students' use of AI in their works, and Grammarly and Hemmingway tools for personal use and development of academic writing skills. However, most teachers (47%) had a basic level of competence of using AI tools in educational activities, that is, they had no or minimal knowledge and understanding of the limited functionality of one or several AI tools.

Among the reasons for using AI tools, the teachers mentioned the need to create additional text materials (for example, questions for testing based on a specified text) for mastering social and humanitarian disciplines (in synchronous and asynchronous learning modes), interest and involvement of students in various activities. At the same time, 45% of the respondents showed a willingness and ability to master new tools with general support, and only 19% of the respondents could quickly and independently create educational content with AI tools and, if necessary, adapt it to the goals of the lesson and their students' needs.

Fear and uncertainty about the feasibility of using AI tools were revealed by 37% of the teachers, who emphasized that they had insufficient training in the use of AI, some noted the inability of AI to provide an individualized approach to student learning due to the template and standardization of query results.

The formative stage of the pedagogical experiment on the implementation of AI tools in teaching activities consisted of work in synchronous and asynchronous modes.

In the experimental activity, we decided not to limit ourselves to the capabilities of the popular ChatGPT but offered the teachers of secondary and higher education institutions to familiarize themselves with the functionality of other AI tools and determine their advantages and disadvantages in terms of effectiveness in practical activities. We chose from a large number of different AI tools, paying attention to the following primary requirements: free usage of certain elements; a simplified subscription system; the convenience of the interface, which could contribute to the intuitive adjustment of tools to the needs of every teacher; unlimited options for generating and using content or providing a sufficiently high monthly credit for free so that teachers are able to experiment with forms and methods of generating educational content. Thus, we chose the following tools with AI, which we distinguished by categories:

- 1) tools for generating visual content, for example, interactive presentations for lessons: Curipod, Gamma;
- 2) tools for creating text materials and tasks for them, including multiple choice questions, short answer questions, and open-ended prompts to the generated text: Twee, Conker, DeepAI, MagicSchool;
- 3) lesson planning tools: Eduaide, Hilink, MagicSchool.

During the synchronous work at one-week professional development courses, the teachers had the opportunity to familiarize themselves with the functionality of the proposed tools, received the necessary recommendations for their use, had the opportunity to work on certain tools in mini-groups, performing specific practical tasks (for example, the development of interactive lessons of social and humanitarian disciplines, accompanying educational materials for synchronous and asynchronous learning of students, assessment, both formative and summative).

The asynchronous work lasted for one month and included the performance of practical tasks posted in the group of professional development courses on the Google Classroom

platform, viewing additional videos with explanations and comments, direct implementation of tools in teaching activities, participation in a forum to discuss the results and share their experience regarding practical findings when implementing AI tools in teaching activities.

Analysing the results of the formative stage of the experiment in the context of our research, we studied and summarized the experience of the teachers of social and humanitarian disciplines regarding the use of AI tools in educational activities.

Thus, while generating visual content and interactive presentations for lessons, the teachers of foreign languages, in particular, English, noted the effectiveness of the Curipod tool, which offers 10-15 slides based on the keywords of the topic (both stationary and informative, and interactive with the possibility of voting, providing an open answer and/or immediate feedback from AI), in which the teachers made minimal adjustments, depending on the goals of the lesson. The teachers of other social and humanitarian disciplines noticed that the system generates part of the slides in English, even if the keywords of the topic were entered in Ukrainian and/or another language, so they had to translate the content and/or create their own slides (both informational and interactive), which slightly slowed down the process of planning and creating interactive slides.

However, all the teachers noted that Curipod is also an effective tool for implementing formative assessment, since at the end of the lesson, the system generates a report on all the activities that have been integrated into the lesson and the distribution of students' answers, which helps them form a holistic footprint of every student's learning and allows for revision or adaptation of certain material to meet every student's needs. Therefore, the teachers were able to adjust forms, methods and/or educational strategies, to ensure a differentiated approach to educational activities, taking into account the individual and age characteristics of their students, their language and speech preparation, to identify gaps in the knowledge of students before the final assessment, to provide instant feedback on their students' achievements.

Compared to Curipod, the teachers noted the limited functionality of the Gamma tool, in which AI only generated stationary slides for the lesson topic, requiring the teachers to use additional tools to integrate interactive activities. However, the content generated by AI was accessible based on the language used to enter keywords and queries, the visual was selected by the system as appropriate, and the text was well structured. The availability of free credits allowed creating only 10 presentation options; using available credits, Gamma was used as a common tool for creating presentations in manual mode.

Regarding the general process of working with Curipod and Gamma tools, the teachers noted the user-friendly interface, adaptability to needs, acceptability of the created information, and simple settings.

Examining the functionality of the tools for creating text materials and tasks for them, including multiple choice questions, short answer questions, and open-ended prompts to the generated text, the teachers equally noted the effectiveness of Twee, Conker, DeepAI, and MagicSchool tools.

Twee's free plan includes 20 AI runs per month for text tools, 10 runs per month for media tools, a 5-minute video limit, and export to PDF. However, the proposed options are able to fully satisfy the needs of the teachers of social and humanitarian disciplines when creating educational material for lessons, as the tool allows reducing the time for the preparation of additional activities of different levels on any topic. Thus, the teachers mainly used such options as converting audio or video into the text, creating texts based on the keywords of the topic, creating tests with multiple choice questions, open answers and exercises to practice vocabulary, choosing true and false statements, filling in the blanks, combining words and their definitions, etc. These types of activities are aimed at developing students' vocabulary, focusing on key and/or target words, and developing reading and writing skills. However, the grammar exercises are limited and the exercises for developing speaking skills need improvement.

Conker provides an opportunity to create texts of different levels in 34 languages, including Ukrainian, and accompanies them with matching tasks, multiple choice questions and filling in the blanks. Among the advantages, teachers noted:

- 1) audio accompaniment of texts, questions and answers, i.e., there is an immersive reading function, which allows creating an inclusive educational environment for students with visual impairments to easily access text material;
- 2) the ability to provide links to created tasks to students, which ensures interactivity of work both in synchronous and asynchronous mode. The system collects and summarizes information about answers and provides feedback, which helps teachers also implement formative assessment, receive feedback from students on their educational activities and adapt the form and methods of work during subsequent lessons.

The simple setting of DeepAI was noted by the vast majority of the teachers, who used the tool to generate additional texts for the development of reading skills, working out the lexical base by topic and grammatical constructions. The principle of working with the tool resembles ChatGPT; the difference is in the approach to saving requests and in the construction of the interface in general, which does not affect the general essence. When working with DeepAI, there is no registration, which contributes to the issue of maintaining the confidentiality of personal data. An additional advantage of DeepAI is that the system creates materials in the language in which the teacher sets the task, including Ukrainian or the languages of national minorities of Ukraine.

The functionality of DeepAI also allows creating pictures in several available styles, but it is worth noting the fact that the tool generates more acceptable visuals (pictures) based on the description in English, which allowed English language teachers to experiment with creative work forms during the educational process (for example, the teachers offered their students tasks to develop listening skills, which involved the creation of images according to the type of description that was in the audio file, and speaking skills when students presented their pictures, etc.). Moreover, the teachers of other social and humanitarian subjects faced additional challenges regarding the necessity to translate the content through Google translate, for example. The teachers of social and humanitarian disciplines noted that when creating pictures via DeepAI, the probability of various errors and inaccuracies is quite significant, although, in their opinion, pictures with inaccuracies could also be used when teaching, because doing such tasks students learn to analyse visual content, critically evaluate the image, compare it with the original description, analyse the differences and discuss them in a (mini-)group, which also contributes to the development of speaking skills.

However, we should admit that the teachers of social and humanitarian disciplines emphasize the effectiveness of using visual content in order to increase their students' motivation, so the functionality of DeepAI is worth paying attention to.

The MagicSchool tool includes the widest range of free options, which can meet any educational needs of teachers and students: it generates ideas for academic and/or informational content, mini-projects, group work, quotes of the day, teacher jokes, lesson plans, texts on any topic and various tasks for them, converts video and audio material into text form, etc. In addition, AI MagicSchool responds to the Ukrainian language, although the content is created in English, a teacher can change the settings for any other language (the system can work with 36 languages, but the Ukrainian option is still missing which is considered a significant limitation for non-foreign language teachers).

Also, the teachers noted that the tools offer a more accurate result if a clear and detailed task is set, while the texts created by Twee, Conker, DeepAI and MagicSchool were logical and structured, although the tasks for them were predominantly of a formulaic nature, which can be explained by the typicality of the requirements for the tasks. Accordingly, the adequacy of generated materials for natural sciences should be checked additionally, involving specialists.

In addition, the teachers of secondary and higher education institutions tested the functionality of lesson planning tools such as Eduaide, Hilink, MagicSchool and noted that:

1. Lesson planning with these tools is based on the educational requirements and standards used in the USA, which are significantly different from the Ukrainian ones.
2. Lesson plans are mainly presented concisely, without additional explanations or suggestions regarding the forms and methods of implementation.
3. There are no references to textbooks, i.e., the proposed plans are detached from the Ukrainian educational context, although, when developing additional lessons to the topic determined by the teacher, AI results contain ideas that can be adapted by the teacher regarding the lesson goals and students' needs.
4. AI creates plans depending on the settings specified by the teacher (for example, the target audience, lesson objectives, etc.).

However, the Eduaide tool also allows adapting the lesson plan and offers activities according to Bloom's taxonomy and the 5E lesson plan which is based on an instructional model that consists of five phases or steps: Engage, Explore, Explain, Elaborate, and Evaluate, which can be further implemented through the Nearpod platform in synchronous learning mode. Also, AI in Eduaide additionally offers to add to the lesson several activities of the teacher's choice, create tasks for independent practice, cooperative learning or add elements of gamification (for example, various quizzes, Jeopardy games, Bingo games, quest-room games, etc.), which organically are integrated into the lesson. Among the advantages, the teachers noted the effectiveness of the tool when implementing formative assessment, as the tool provides an opportunity to additionally take into account the types and methods of assessment when planning a lesson.

The teachers could make additional exercises and corrections to the lesson plan created with Hilink through the chat integrated into the platform for communication with AI or through a separate "Activity Generator" tab. The tool also allows creating individual courses, adding students to an online class, sharing files, etc., which can become an alternative to Google Classroom.

Thus, the teachers of social and humanitarian disciplines note that the materials created by AI with the proposed tools are logical, structured, and adequately formulated, in contrast to the materials created for the subjects of natural sciences, as related specialists claim [8].

At the control stage of the pedagogical experiment, we conducted a final survey among the teachers of social and humanitarian disciplines of secondary and higher education institutions in order to find out the quantitative and qualitative changes according to the determined indicators (Fig. 2). At the control stage, the dynamics of the formation levels of every individual indicator were analysed and summarized, the quantitative values of which were determined using mathematical statistics methods.

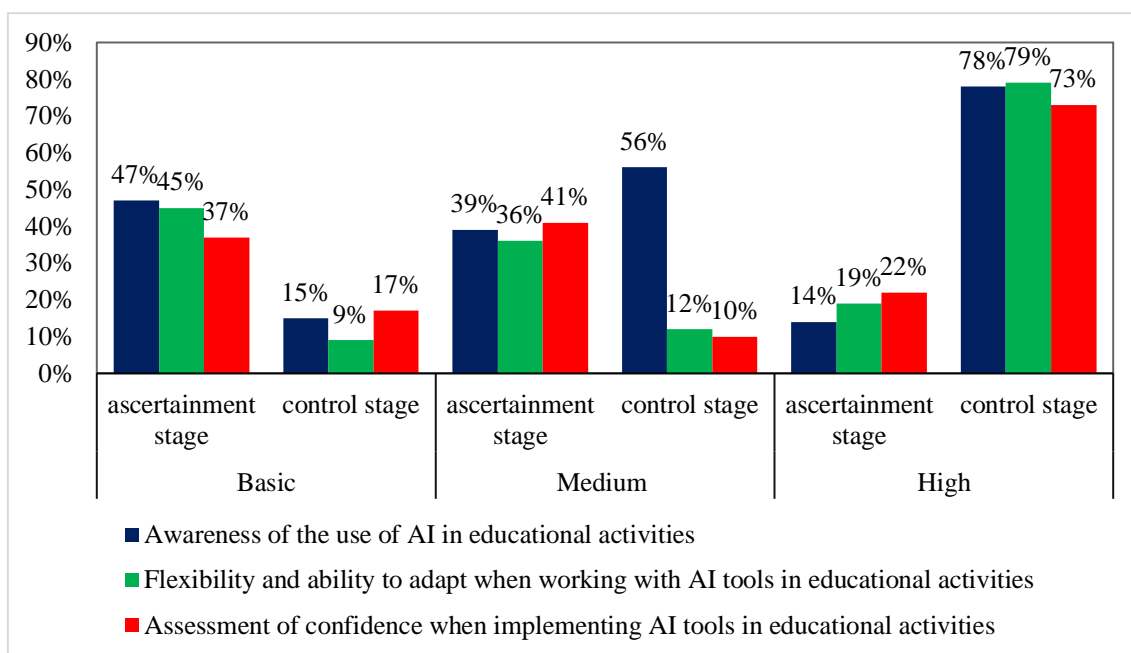


Figure 2. Levels of formation of the indicators at the ascertainment and control stages of the experiment

Comparing and analysing the data of the ascertainment and control stages of the experiment (Fig. 2), we see positive dynamics of changes for every individual indicator. Thus, at the control stage, the teachers of social and humanitarian disciplines became more confident users of AI tools. A high level of competence in the use of AI tools in educational activities was shown by 79% of the respondents who demonstrated thorough knowledge of the use of AI opportunities in educational activities, understood the limitations and potential of 5-6 tools, and could explain their impact on teaching and educational activities. At the same time, the distribution of high-level results was only 14% at the ascertainment stage, when the vast majority of the teachers of social and humanitarian disciplines (47%) had a basic level of competence in the use of AI tools in educational activities, that is, they had minimal knowledge and understanding of the use of one or several AI tools, however, they showed a willingness to learn new AI tools with the support and help of facilitators.

Also, at the control stage of the experiment, 79% of the respondents had a high level of flexibility and ability to adapt when working with AI tools in educational activities, that is, they could set appropriate system settings, independently create and adapt text and visual content for educational activities, generate ideas about forms and methods of working with the proposed tools. At the ascertainment stage, the majority of the social and humanitarian disciplines teachers (45%) still needed additional templates and instructions when working with AI tools.

The indicator of confidence when implementing AI tools in educational activities also underwent quantitative and qualitative changes at the control stage. Thus, at the ascertainment stage, 37% of the teachers felt fear and insecurity in using AI tools and emphasized their lack of training; some of them argued that AI was unable to provide a personalized approach to learning due to its formulaic and standardized output. However, some of the teachers of social and humanitarian disciplines, on the contrary, being delighted with the possibilities of AI, neglected the critical assessment of the results obtained, which can be explained by the novelty of the teachers' activities during the professional development courses. At the control stage of the experiment, 73% of the teachers had a high level of competence in using AI tools in educational activities and subjected all AI-generated results to critical analysis.

Therefore, the use of AI tools in educational activities, based on the experience of the teachers of social and humanitarian disciplines, has the following advantages:

1. Saving time when planning and developing additional educational materials. Using AI tools, teachers are able to adjust the necessary parameters to match the lesson objectives and the educational needs of the students, and the system generates as much content as the teacher needs.
2. Provision of differentiated education. Using multi-level tasks generated by AI tools, teachers are able to diversify educational activities, focusing on the development of different skills, for example, reading or writing skills in foreign language classes.
3. Individualization of training. By adapting AI-generated text and visual content, teachers are able to personalize assignments according to students' needs and interests.
4. Implementation of formative assessment. Using AI tools, teachers can receive immediate feedback on the educational progress of both individual students and the entire class in order to adjust educational activities as necessary.
5. Extension of materials to a specific topic. After analysing the results of students' academic progress, teachers are sometimes faced with the need for additional study of the topic, although the textbooks offer a limited number of exercises, so the use of AI tools provides an additional expansion of the educational material that meets the students' needs and the lesson objectives.
6. Generation of additional ideas. Teachers can use AI tools to generate additional ideas for work forms and activities at the lessons that are easily adaptable and can be creatively reimagined according to the educational context.

However, we also emphasize certain nuances when working with AI tools in the context of teaching social and humanitarian disciplines, which include:

1. Ambiguity of results. The implementation of AI can have mixed results depending on exactly how the AI tools are used. For example, imprecise queries can lead to inaccurate results, so the use of AI tools requires additional critical evaluation of the generated results.
2. Potential dependency on technologies. If teachers become too dependent on AI in the teaching process, there may be a problem with personal adaptation to change or the inability to adapt to situations without the use of technology.
3. Standardization of results. AI algorithms may not always provide a sufficiently individualized approach to the needs of every learner, as they are based on standard templates that undergo minor modification through repeated inquiry.
4. Privacy and ethics issues. The use of AI can create issues with the privacy of student data and raise ethical questions, especially when it comes to the collection and processing of personal information.
5. The need for training. Teachers may need significant training to use AI effectively, which may require time and resources. Moreover, the teachers have to be aware of additional tools for translation since AI mostly generates content in English.

Therefore, it is important to balance the advantages and disadvantages of using AI in the educational process, taking into account the potential to improve learning while avoiding possible negative consequences.

Also, in our opinion, it is worth taking into account a number of limitations that can affect the results of the study:

1. The limited time allocated to the experimental part, the defined AI tools and resources for conducting the research and the lack of full control over the participants of the experiment may limit the scope, depth of the analysis and the overall representativeness of the results.
2. Given that some aspects of the use of AI tools may be new or ambiguous for teachers of social and humanitarian disciplines, the evaluation may be subjective and depend on the individual opinions and experiences of the research participants.

3. Research results may be limited in transferability to other contexts, as they may be specific to a particular educational institution, group of students, or teachers. Thus, the teachers of social and humanitarian disciplines of secondary and higher education institutions were involved in the pedagogical experiment; in case of participation of teachers of natural sciences, the obtained results could be different, according to the context and specifics of the subjects.
4. While 82 teachers may seem like a significant number, it may not be representative enough to draw general conclusions. A larger and more diverse sample will ensure greater generalizability of the results.

#### **4. CONCLUSIONS AND PROSPECTS FOR FURTHER RESEARCH**

The authors highlight several important points regarding the integration of AI tools in education, especially in the field of teaching social and humanitarian disciplines.

The authors of the article investigated the level of competence of the teachers of social and humanitarian disciplines when working with AI tools. The research on teachers' competence in using AI tools highlights the need to improve their qualifications and skills in using AI effectively. This recognition of the need to improve teacher preparation is consistent with a broader understanding that teachers must adapt to technological advances to remain effective in their role.

The expediency of using AI tools in educational activities in the context of teaching social and humanitarian disciplines was experimentally verified. The experiment provided empirical evidence supporting the integration of AI technologies into teaching practices. Recognizing the potential of AI to revolutionize education, by enabling personalized learning, automating administrative tasks, and providing instant feedback, demonstrates an understanding of the transformative impact AI could have on the educational process.

Although there are a large number of AI tools available, the authors consider teachers should decide on the tools that are convenient and effective for their specific needs and goals. At the same time, an important aspect is the critical understanding and creative adaptation of the AI results, since there may be inaccuracies in the AI's answers and clichés that do not meet the lesson's objectives, and the inconsistency of the generated content with modern educational programs and requirements, etc.

The authors value the unique human experience and creativity that teachers bring to the educational process. AI is only a tool designed to simplify routine work and save time for creating additional educational material for students with different levels of academic achievement. However, we also believe that further development of how teachers can effectively utilize AI to enhance their teaching practice would be highly beneficial. It is important to create and adhere to ethical standards when using AI in education. This means avoiding biases when teaching and assessing, ensuring the confidentiality of student data, and creating transparent mechanisms to regulate the use of AI. That is why we consider it necessary to further study the problems of using the educational potential of AI tools, the development of digital competence of teachers (in particular, social and humanitarian disciplines), and the formation of a conscious understanding of risks and limitations in this area by both teachers and students.

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## ІНСТРУМЕНТИ ШТУЧНОГО ІНТЕЛЕКТУ У ВИКЛАДАННІ СОЦІАЛЬНО-ГУМАНІТАРНИХ ДИСЦИПЛІН

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**Анотація.** З огляду на стрімкий розвиток інформаційних технологій використання цифрових рішень в освітніх цілях стає все більш актуальним та перспективним. Це спонукає до оцінки та розвитку нових методів, які забезпечують персоналізований підхід до викладання та навчання, включно з інтеграцією інструментів штучного інтелекту (ШІ), які мають потенціал революціонізувати галузь освіти. Проте залишається недослідженим питання кваліфікації вчителів щодо використання засобів ШІ в педагогічній діяльності, особливо в соціально-гуманітарних дисциплінах. Тому метою статті є дослідження рівня компетентності вчителів соціально-гуманітарних дисциплін щодо використання інструментів ШІ в освітній діяльності, що передбачає навчання користувачів можливостям, обмеженням та правильному використанню цих інструментів, розуміння того, як отримати користь та уникнути неправильного використання ШІ.

У статті вивчені переваги та виклики застосування інструментів із ШІ, а також наведено аналіз деяких особливостей впровадження різних інструментів ШІ в соціально-гуманітарних дисциплінах.

Реалізуючи педагогічний експеримент, автори не обмежувались використанням інструменту ChatGPT; вчителі мали можливість дослідити особливості ряду інструментів ШІ, які сприяють плануванню уроків, а також створюють візуальний контент, текстові матеріали та завдання для них. Було експериментально перевірено доцільність використання інструментів із ШІ та визначено як переваги, так і суттєві недоліки та предметні нюанси. Також було з'ясовано поточний рівень компетентності вчителів соціально-гуманітарних дисциплін щодо роботи із ШІ. На контрольному етапі проаналізовано й узагальнено динаміку рівнів сформованості кожного окремого показника компетентності вчителів: обізнаність щодо використання ШІ в освітній діяльності; гнучкість та вміння адаптуватися в процесі роботи із ШІ; оцінку впевненості та відкритості до впровадження ШІ в освітній діяльності. Кількісні значення рівнів встановлено за допомогою методів математичної статистики.

У висновках підкреслено як необхідність подальшого вивчення проблематики використання освітнього потенціалу інструментів із ШІ та розвитку цифрової компетентності вчителя, так і формування свідомого розуміння ризиків та обмежень у цій сфері з боку учнів та вчителів.

**Ключові слова:** штучний інтелект (ШІ); соціально-гуманітарна дисципліна; підвищення кваліфікації вчителя; компетентність; освітня діяльність.

