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Stanislav Dovgyi
Doctor of Sciences in Physics and Mathematics, Professor,
Academician of the National Academy of Sciences of Ukraine
President of the Junior Academy of Sciences of Ukraine, Kyiv, Ukraine
ORCID ID 0000-0003-1078-0162
gis_rs@man.gov.ua

Svitlana Babiichuk
Doctor of Sciences in Pedagogy,
Visiting researcher at Harvard Graduate School of Education,
Harvard University, MA, USA
ORCID ID 0000-0001-6556-9351
brevus.lana@gmail.com

Lidiia Davybida
PhD of Geological Sciences, Associate Professor
Associate Professor at the Department of Geodesy and Land Management,
Ivano-Frankivsk National Technical University of Oil and Gas, Ivano-Frankivsk, Ukraine;
Methodologist of the "GIS and RS Laboratory",
National Center "Junior Academy of Sciences of Ukraine", Kyiv, Ukraine
ORCID ID 0000-0002-9796-7124
davybida.li@gmail.com

Mariia Biletska
Acting Head of the "GIS and RS Laboratory"
National Center "Junior Academy of Sciences of Ukraine", Kyiv, Ukraine
ORCID ID 0009-0002-1752-1438
mr.biletska@gmail.com

TEACHERS' AND STUDENTS' ATTITUDES TOWARDS THE USE OF ARTIFICIAL INTELLIGENCE: ALL-UKRAINIAN RESEARCH

Abstract. The steady rise of artificial intelligence (AI) across multiple domains, particularly education, marks a transformative period for the field. Understanding the essential role of teachers and students as active participants in this transformation, as well as the factors influencing their perceptions and attitudes toward AI, is critical. In Ukraine, the emergence and rapid spread of accessible AI tools occurred during a time of full-scale military conflict, bringing about drastic disruptions to traditional educational processes. This study provides insights into these impacts by analyzing the results of a nationwide survey conducted in 2023 on AI's role in education, gathering perspectives from two main groups: educators (N = 1734) and students in grades 8–11 (N = 1448). The data reveal distinct differences in teachers' and students' attitudes towards integrating AI into education. While many teachers recognize AI's potential to aid in tasks like test creation, creative task development, and student progress tracking, they also express concerns about ethical implications and the risk of academic dishonesty. In contrast, a substantial portion of students' view AI as a valuable tool for enhancing learning and promoting self-directed education. Additionally, the study identifies an inverse relationship between the duration of a teacher's professional experience and their frequency of AI use, suggesting that younger educators may be more inclined to adopt these technologies. Among students, however, a positive correlation exists between their year of study and the frequency of AI tool utilization, indicating a gradual increase in AI engagement with advancing grade levels. Based on the results, it can be concluded that AI is currently an additional option for educational activities that will become a necessity in the near future. Therefore, retraining and upskilling teachers and providing them with appropriate quality tools is an essential and urgent task.

Keywords: artificial intelligence; educational process; survey; statistical analysis; factors; length of teaching experience; year of study.

1. INTRODUCTION

The problem statement. Artificial intelligence (AI) is a technology with a revolutionary impact on societal development and significant potential to improve the educational process by increasing efficiency, accessibility, and inclusivity [1]. Over the past few years, marked by the skyrocketed adoption of open- or partially open-access AI tools (ChatGPT, Bard, Midjourney, KNIME, Grammarly, etc.), the participants in the educational process (teachers and students) have become one of the most active users of AI. This concerns primarily generative AI technologies for generating texts, images, abstracts, presentations, tests, etc. [2] and predictive AI systems for analysing student performance and designing optimal strategies for its improvement [3].

AI tools have proven to be advantageous in the educational process. They have been effectively utilised to generate interactive learning materials, customise curricula for individual students, support students with special needs, and automate routine tasks teachers perform, such as correcting mistakes, creating visuals, test tasks, etc. AI technologies allow teachers to focus on creative work and individual interactions with students. Compared to traditional methods, the use of AI in science education and STEM has particular prospects – virtual laboratories and simulations, experiments, and modeling offer new opportunities to explore scientific concepts in a dynamic, safe, and accessible environment [4].

However, excitement about the potential advantages of generative AI is tempered by generally reasonable concerns about students' misuse, plagiarism, and misinformation, and the potential for dehumanisation of education. These concerns have prompted some educational institutions to prohibit the use of generative chatbots. Many teachers, however, see this technology as an unavoidable tool and encourage their students to learn how to use it. Implementing AI in the educational process is obviously a complex task requiring careful planning and preparation. It is necessary to weigh the advantages of utilising AI against any potential risks to ensure the greatest possible benefit for education. It is critical that the use of AI in education is balanced and does not decrease the quality of education. Teachers should use AI tools in such a way that they contribute not only to the effective learning of new knowledge and skills but also to communication between teachers and students, individual support for students, and interpersonal interactions.

Analysis of recent studies and publications. Many studies [1], [5], [6] have found that a large number of educators and researchers now agree that the incorporation of AI into education has resulted in a significant paradigm shift in teaching and learning, presenting both unprecedented opportunities to improve learning efficiency and complex challenges to the educational community. Additional research highlights potential problems [7], [8], [9], [10] and perspectives [11], [12] related to the use of AI in education, particularly its role in mitigating the adverse effects of the Covid-19 pandemic, such as a decline in student performance, an increase in educator workload, and a decrease in planning time due to staff shortages and other factors. Therefore, AI has the potential to facilitate equitable access to educational resources, ultimately improving students' chances of success.

Among the key ethical issues related to the use of AI in education, most of the publications reviewed highlight the bias and lack of transparency of AI algorithms [13], [14], [15], which can lead to discrimination against certain groups of students and make it difficult to understand why certain decisions were made, such as grading. In addition, the extensive use of AI tools may lead to a loss of interpersonal interaction in the classroom: students who constantly use AI to learn may have fewer opportunities to interact with teachers and classmates, and teachers who constantly rely on AI tools to teach may lose their skills in communicating and connecting with students [16]. Another obvious problem is that AI tools can generate text that looks very similar to manmade text, which can lead to student plagiarism.

AI tools may also be inaccessible to some students, such as those with limited access to the internet or technology. There are also some concerns about the potential for AI developments to lead to job losses for teachers and other educators, as it may automate some tasks previously performed by teachers, as well as growing privacy concerns about students' personal data that AI services may collect [17].

A clear ethical framework for using AI in education must be developed to ensure it is applied fairly, responsibly and inclusively. In November 2021, UNESCO published the Recommendation on the Ethics of Artificial Intelligence (AI) in Education, Science and Research [18], which, among other things, calls on UNESCO Member States to develop policies and regulations for the ethical use of AI in education, science and research, to invest in research and development of ethical AI, to raise awareness of ethical issues of AI among educators, researchers, and the general public, and to promote international cooperation in the field of AI ethics.

The global educational crisis caused by the COVID-19 pandemic has also reached Ukraine, and the period of rapid advancement and integration of AI tools into the educational process coincided with full-scale military hostilities brought on by Russian aggression [19], [20]. The war in Ukraine has led to significant changes in the educational process. Both teachers and students who stay in Ukraine experience negative effects from the war on their personal and professional lives [21]. The war in Ukraine has also resulted in massive underfunding of education (a 27% reduction of the budget for education, representing a UAH 17367,7 million drop over the past two years [22] due to shifting state funding priorities, high migration, the occupation and destruction of educational institutions, and massive shelling-related power outages. These factors have a significant negative impact on teachers' psychological well-being and motivation. Under conditions where many schools have been destroyed or damaged, and teachers and students have been forced to adapt to restrictions and threats, AI can become an essential tool to ensure access to education and maintain the quality of learning.

The research goal. To better understand how artificial intelligence is used in Ukrainian schools today and what prospects AI tools have in the future, a nationwide survey on the use of AI in education was conducted by the Junior Academy of Sciences of Ukraine – the largest state-run educational institution coordinating research activities of Ukrainian students in various fields, NGO Projector Creative & Tech Institute and research company Factum Group Ukraine. Educators and students from all regions, except for the territories occupied by Russia since 2014, took part in the survey. Information support for the survey was provided by the Ministry of Education and Science of Ukraine.

The survey's goal was to determine how actively AI and AI-assisted possibilities are used in Ukrainian school education, to assess the attitudes of both Ukrainian students and teachers toward the use of AI in teaching and learning, and to answer the following relevant questions:

- Use of artificial intelligence for curriculum development or application of AI in the classroom – a necessity, an option or an unnecessary tool?
- What measures should be taken to ensure that the use of AI contributes to the development of students rather than vice versa?

Based on the data obtained in the aforementioned all-Ukrainian survey, the authors of this article formulated additional tasks, namely:

- How do teachers' pedagogical experience and students' grades influence the level of interest in using AI technologies?
- Are there any differences between the specific features of AI used in the educational process and the attitudes of students and teachers towards the use of AI in different regions of Ukraine?

2. RESEARCH METHODS

In September-October 2023, the initial stage of this study – the data collection through an anonymous online survey (CAWI – Computer Assisted Web Interviewing) – was carried out by Projector Creative & Tech Institute and Junior Academy of Sciences of Ukraine with the support of the Ministry of Education and Science of Ukraine. Two questionnaires in Google Form format for teachers and students were distributed through the Junior Academy of Sciences of Ukraine and partner educational organisations, as well as social media pages of the study initiators and the Ministry of Education and Science of Ukraine. Participants in the survey were drawn from general secondary education institutions across all administrative regions of Ukraine, including representatives of both teachers and students. However, the residents of the temporarily occupied territories of Ukraine since 2014 (Crimea, partially Donetsk and Luhansk Oblasts) were not able to participate in the survey, except for internally displaced persons. A total of 2003 teachers and 1806 students sent their responses during the two-month survey. The primary results of the surveys were pre-processed, data was cleared, and incomplete, duplicate, or contradictory responses, as well as answers from respondents who are not currently working at school or holding positions other than teachers, were deleted. Thus, the authors of the study formed samples of survey data from two target audiences:

- Teachers who work in schools at the time of the survey – a total of 1734 respondents (Fig.1). The distribution of respondents in this sample by teaching experience is as follows: 15,4% have less than five years of experience, 14,0% – 6-10 years, 13,5% – 11-15 years, 12,8% – 6-20 years, 14,2% – 21-25 years, 14.5% – 26-30 years, and 15.6% – over 30 years. The average length of teaching experience in the sample is 19 years. 15% of the surveyed teachers said that the educational institution where they work or have worked was affected by military aggression, and the vast majority – more than 80% – answered that some of their students were forced to go abroad.
- There were 1448 students in 8-11th grades at the time of the survey, including those who went abroad (Fig. 2). The distribution of this sample by year of study is as follows: 25,2% – 8th grade, 26,6% – 9th grade, 24,5% – 10th, 23,7% – 11th grade. Among the students included in the sample, 9% lived abroad at the time of the survey. Also, 20% of students said they had to change schools after 24.02.2022, and 15% reported that their school was affected by military aggression.

The choice of such a limited age group of school students (the vast majority of students included were over 14 years old) is due to the fact that this group was mainly involved in the events run by the JASU – the largest state-funded institution in Ukraine that coordinates students' research and extracurricular activities, including science education. The term 'science education' itself is not used in Ukraine's legal documents today. However, a number of social factors have had a certain impact on this situation, including the establishment of the UNESCO Centre for Science Education at the JASU and the UNESCO Chair in Science Education at the National Pedagogical Dragomanov University. A periodical, 'Science Education: Theory and Practice', was launched, and the Science Education NGO was established. Ukrainian scientists are members of many leading educational organisations, including the All European Academies (ALLEA) Working Group on Science Education. Ukrainian scientists [22], [24] have formulated the concept of science education as an educational process that should form a person's scientific style of thinking, as well as an educational concept aimed at the synergy of education and science, based on purposeful, mainly research activities to develop students' research competence and scientific literacy. Analysis of the AI use by teachers and students is appropriate precisely in view of the prospects for developing science education in Ukraine. After all, the main goal of applying the elements of science education in various teaching methods is that the students learn to act and make decisions independently, and the teacher

promotes their independence as much as possible. In turn, teachers must deeply understand the methodology and stages of the research process and combine them depending on the theme and the result to be achieved, as well as possess thorough fundamental knowledge of the research field [23].

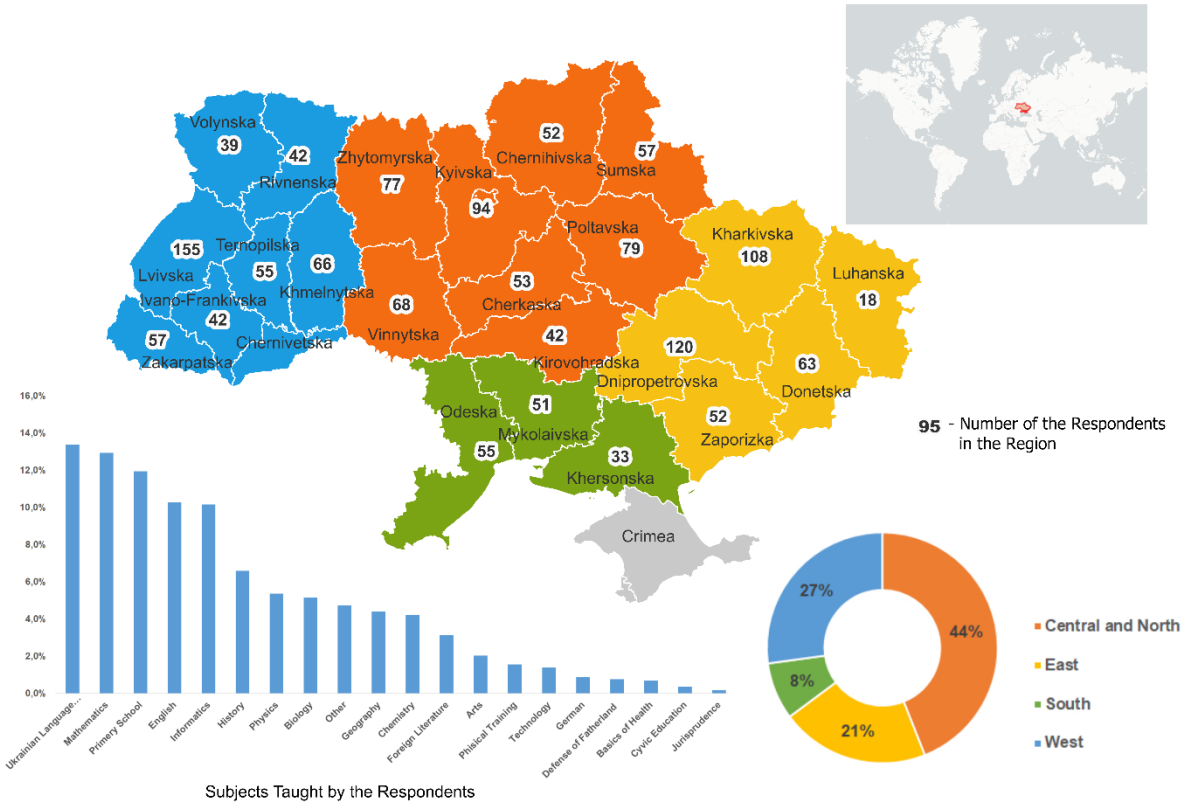

Figure 1. Teacher sample profile

All the results are based on the surveyed participants' experience (or lack thereof) of using AI in the educational process. The voluntary participation in the survey ensured this study's compliance with ethical rules. All participants were also informed about the purpose of the survey, its confidential nature, and the right of nondisclosure of personal data, schools where they study or work, or any other identifying information. Each participant confirmed their consent to use the information provided for the study. The respondents' attitudes, opinions, and experiences were used only to achieve the purpose and objectives of the study, not for any other purpose.

The questionnaires for both students and teachers were designed to meet the goals and objectives of the study and included three thematic categories of different questions.

The first category covered the general and personal characteristics of the respondents. The questionnaire for the teachers included the following questions within the said category: current or past teaching status, subject taught, years of teaching experience and school location by region. The questionnaire for the students included the following questions: current grade, region of the school attended before the full-scale invasion, hobbies and future career aspirations and reasons for choosing a profession.

The second category focused on the impact of military aggression on both the schools where respondents worked or studied, as well as on the respondents themselves. For teachers, the questions addressed the approximate number of students before the full-scale invasion, whether the school had suffered damage due to Russian military actions, and whether there

were students evacuated abroad, including their approximate numbers. For students, the questions included whether they had to change schools after February 24, 2022, their current location and school if evacuated, and whether their home educational institution was affected by Russia's military actions.

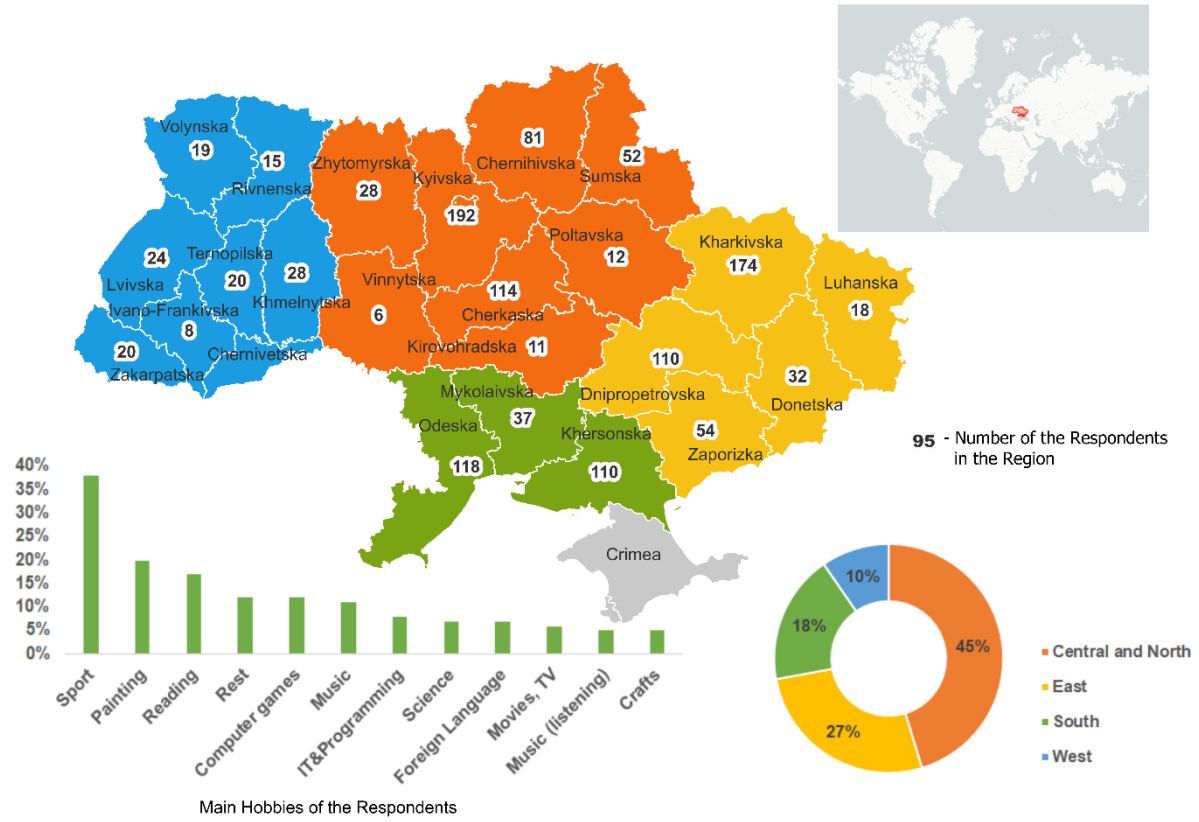

Figure 2. Student sample profile

The third category focused on thematic questions regarding the use of AI tools and respondents' attitudes toward them, with questions organized by type and utilizing Likert scales where applicable. The questionnaire for teachers explored their familiarity with AI, the tools they know (e.g., ChatGPT, Midjourney), how they learned about AI (e.g., social media, colleagues), and their recent usage. It also addressed how often they encouraged students to use AI and for what purposes (e.g., lesson planning, and homework). Teachers evaluated their success with AI, the likelihood of recommending it to colleagues or students, and their views on AI's potential impact on education. The student questionnaire examined their awareness and usage of AI, asking which tools they know, how they learned about AI (e.g., social media, school), and how frequently they used AI. Students rated their experience, noted where AI helped them (e.g., homework), and shared opinions on AI's role in the future of education. In addition to the internationally renowned services GPT, Grammarly, Bard Google, Midjourney, Notion AI, and Stable Diffusion, the answers to the question about the AI tools used included the Personal Assistant of a Modern Teacher, 2024, an AI tool that emerged within the national Ukrainian educational project Na Urok [25].

The primary research data – the survey results – were processed with Excel and R Studio software using quantitative methods generally accepted for such analyses.

The methods used include the calculation of frequencies, percentages, statistical characteristics of the sample and criteria for assessing the difference between the mean values

of two independent samples. Non-parametric (rank) correlation analysis was used to determine the dependencies between samples.

A marketing tool, the Net Promoter Score (NPS) loyalty index [26], was used to assess teachers' willingness to recommend AI services to other teachers and students. The NPS methodology in education has recently been used to measure and evaluate the effectiveness of learning and development initiatives [27]. The NPS framework is simple and effective for collecting teachers' feedback on their experience and likelihood of recommending a product to others and systematising and visualising the survey results.

3. THE RESULTS AND DISCUSSION

3.1. Teachers' Views towards AI Use

Almost all interviewed teachers have heard of the AI services – less than 1% of respondents said they had not heard of any services mentioned in the questionnaire. At the same time, almost 70% have used at least one of them in the last 6 months before the survey. The primary source of information about AI services used by the teachers was social media, as indicated by 64% of respondents. Also, almost 1 in 2 teachers (50% of respondents) received information about AI in lectures, courses, intensives, or other educational materials. About 33% of the surveyed teachers had heard about AI from friends/colleagues, and approximately the same proportion of teachers had searched for information about AI services on their own.

It was found that ChatGPT and AI tools developed for the national Ukrainian educational project Na Urok are the most popular among all surveyed teachers – 69% and 48% of the respondents, respectively, mentioned them in their questionnaires. Such services as Grammarly, Bard Google, Midjourney, Notion AI, and Stable Diffusion are much less popular among teachers: they are not only underused but also little known (only 6 to 14% of respondents mentioned them in the questionnaire). It is also noteworthy that the use of AI tools developed within Na Urok and Grammarly projects, in some way, depends on the subject taught by the teacher. For example, Na Urok is much more popular among Ukrainian language/literature and history teachers, while Grammarly is much more popular among English teachers. Computer science teachers generally have a much higher knowledge of all AI services and use them more actively. For example, 80% of computer science teachers say they have been using ChatGPT in the last six months before the survey. On the other hand, biology, geography, and primary school teachers have a lower level of use of both ChatGPT (38%) and other services (35%).

The majority of teachers who have had experience using AI consider it to be successful. Only 14% of the surveyed teachers found their experience unsuccessful.

The survey results also show that every 2nd teacher believes AI will change the educational process in the coming years. Already, teachers say that they use AI services in their activities to prepare for classes, create tests for homework, conduct classes, as well as to test students' knowledge, and even in extracurricular activities. In general, there is a dependence on the use of AI services: the shorter the teacher's work experience, the more active the use, which may be due to the fact that younger people (with less teaching experience) are generally more active in interacting with digital technologies.

The quantitative characteristics of the answers to the questions about the involvement of students in the use of AI, the success of the experience, and the assessment of the impact of AI tools on the educational process in the near future, which included a ranking by the respondent, are presented in Table 1 with the breakdown by categories based on the length of their teaching experience.

Table 1

Descriptive statistics of teachers' Likert scale responses on encouraging AI usage, impressions of AI, and perceived impact on education, categorized by years of teaching experience

Statistics	All responses	fewer than 5 years	6-10 years	11-15 years	16-20 years	21-25 years	26-30 years	more than 30 years
Have you encouraged students to use AI? (Cannot say – 0; No, and I don't plan to – 1; No, but I plan to – 2; Yes, once – 3; Yes, several times – 4; Yes, regularly – 5)								
Valid N	1734	265	242	232	221	245	250	268
Mean	2,597	2,479	2,665	2,634	2,629	2,604	2,580	2,631
Median	2	2	2	2	2	2	2	2
Mode	2	2	2	2	2	2	2	2
Min	0	0	0	0	0	0	0	0
Max	5	5	5	5	5	5	5	5
Lower Q	2	2	2	2	2	2	2	2
Upper Q	4	4	4	4	4	4	4	4
Variance	1,810	1,940	1,792	1,861	1,971	1,625	1,666	1,829
St. Dev.	1,345	1,393	1,339	1,364	1,404	1,275	1,291	1,353
How successful was your experience with artificial intelligence if you have tried it? (Cannot say – 0; Not at all successful: I have a disappointing experience with AI – 1; Not really successful: I encountered some problems and challenges – 2; Neutral: I don't see any particular advantages of AI use – 3; Successful: AI offers certain benefits for my work – 4; Very successful: AI has significantly improved the process – 5)								
Valid N	1280	200	187	177	163	177	171	197
Mean	3,588	3,805	3,615	3,582	3,583	3,605	3,556	3,365
Median	4	4	4	4	4	4	4	4
Mode	4	4	4	4	4	4	4	4
Min	1	1	1	1	1	1	1	1
Max	5	5	5	5	5	5	5	5
Lower Q	3	4	3	3	3	3	3	2
Upper Q	4	4	4	4	4	4	4	4
Variance	0,835	0,821	0,733	0,870	0,837	0,740	0,684	1,049
St. Dev.	0,914	0,906	0,856	0,933	0,915	0,860	0,827	1,024
Do you agree or disagree with the statement „Artificial intelligence will change the educational process in the coming years"? (Cannot say – 0; Completely disagree – 1; Rather disagree – 2; Neutral attitude – 3; Rather agree than disagree – 4; Completely agree – 5)								
Valid N	1734	265	242	232	221	245	250	268
Mean	3,216	3,445	3,413	3,216	3,113	3,061	3,136	3,175
Median	4	4	4	4	4	4	4	4
Mode	4	4	4	4	4	4	4	4
Min	0	0	0	0	0	0	0	0
Max	5	5	5	5	5	5	5	5
Lower Q	2	2	2	2	2	2	2	2
Upper Q	4	4	4	4	4	4	4	4
Variance	2,134	2,149	2,044	2,101	2,119	2,140	2,022	2,160
St. Dev.	1,345	1,466	1,430	1,449	1,456	1,463	1,422	1,470

The Kruskal-Wallis test results presented in Table 2 show that there is no statistically significant difference across different teaching experience groups regarding whether teachers encourage students to use AI (p=0,717). This indicates that teaching experience does not significantly affect teachers' likelihood of encouraging AI use in their classrooms. However, when it comes to the success of teachers' personal experiences with AI, there is a significant difference among the groups (p = 0,0004). Teachers with fewer than 5 years of experience

report the highest success with AI, as reflected by the highest mean rank of 720,2, while those with over 30 years of experience report the lowest success, with a mean rank of 563,4. Regarding the perception of AI's impact on education, the test results indicate a significant difference across teaching experience groups (p = 0,002). Teachers with fewer than 5 years of experience are more likely to agree that AI will change the educational process, as seen in their highest mean rank of 947,9, while teachers with 21-25 years of experience are less likely to agree, with the lowest mean rank of 803,7.

Table 2

Results of the non-parametric Kruskal-Wallis test for the survey data by different age groups of respondents

Experience	up to 5 years	6-10 years	11-15 years	16-20 years	21-25 years	26-30 years	more than 30 years
Have you encouraged students to use AI?: H (6, N= 1723) =3,705 p =0,717							
Valid N	265	242	232	221	245	250	268
Mean Rank	816,1	883,7	875,4	872,1	863,9	853,6	874,0
How successful was your experience with AI if you have tried using it?: H (6, N= 1272) =24,661 p =0,0004							
Valid N	200	187	177	163	177	171	197
Mean Rank	720,2	643,6	633,9	634,5	641,8	614,2	563,4
Do you agree with the statement „Artificial intelligence will change the educational process in the coming years”?: H (6, N= 1723) =20,926 p =0,002							
Valid N	265	242	232	221	245	250	268
Mean Rank	947,9	930,8	858,2	817,4	803,7	822,0	845,5

The rank correlation between the survey results and the teaching experiences of the surveyed educators was calculated using the Spearman and Tau Kendall coefficients. It shows that the frequency of student engagement in AI use is independent of the teachers' age (the Spearman correlation is 0,006, and the Kendall Tau is 0,016). The rank correlation analysis reveals that the correlation between respondents' success with AI and their agreement with the statement that „AI will soon change the educational process" is statistically significant, even though the relationships are weak. Specifically, the Spearman correlation for agreement with the statement is -0,076, and the Kendall Tau correlation is -0,067. Similarly, for the question on the success of AI use, the Spearman correlation is -0,065, and the Kendall Tau is -0,097. Despite the weak negative correlations, these values are marked as significant (at $p<0,05$), suggesting that respondents who reported more successful experiences with AI are slightly less likely to agree that AI will soon change the educational process, and vice versa. Although the strength of these correlations is low, the statistical significance implies a noteworthy relationship between perceived AI success and expectations about AI's impact on education.

The differences in the survey findings among respondents from different regions are not significant, which is confirmed by the descriptive statistics (Table 3) and the Kruskal-Wallis criteria for the respective groups (Table 4).

The results of the non-parametric Kruskal-Wallis test showed no significant differences across regions for any of the questions, with p-values well above 0,05 for encouraging AI use (p=0,685), success in using AI (p=0,3395), and the perceived impact of AI on education (p=0,303). The mean ranks were relatively close for each region, further supporting the conclusion that attitudes towards AI in education were consistent across different geographical areas.

Table 3

Descriptive statistics of teachers' Likert scale responses on encouraging AI usage, impressions of AI, and perceived impact on education, categorized by regions

Statistics	All responses	Central and North	South	East	West
Have you encouraged students to use AI? (Cannot say – 0; No, and I don't plan to – 1; No, but I plan to – 2; Yes, once – 3; Yes, several times – 4; Yes, regularly – 5)					
Valid N	1734	763	139	361	471
Mean	2,597	2,619	2,468	2,615	2,588
Median	2	2	2	2	2
Mode	2	2	2	2	2
Min	0	0	0	0	0
Max	5	5	5	5	5
Lower Q	2	2	2	2	2
Upper Q	4	4	4	4	4
Variance	1,810	1,858	1,570	1,854	1,775
St. Dev.	1,345	1,363	1,253	1,362	1,332
How successful was your experience with artificial intelligence if you have tried it? (Cannot say – 0; Not at all successful: I have a disappointing experience with AI – 1; Not really successful: I encountered some problems and challenges – 2; Neutral: I don't see any particular advantages of AI use – 3; Successful: AI offers certain benefits for my work – 4; Very successful: AI has significantly improved the process – 5)					
Valid N	1280	563	99	272	346
Mean	3,588	3,648	3,545	3,529	3,546
Median	4	4	4	4	4
Mode	4	4	4	4	4
Min	1	1	1	1	1
Max	5	5	5	5	5
Lower Q	3	3	3	3	3
Upper Q	4	4	4	4	4
Variance	0,835	0,727	0,883	0,981	0,880
St. Dev.	0,914	0,852	0,940	0,990	0,938
Do you agree or disagree with the statement „Artificial intelligence will change the educational process in the coming years"? (Cannot say – 0; Completely disagree – 1; Rather disagree – 2; Neutral attitude – 3; Rather agree than disagree – 4; Completely agree – 5)					
Valid N	1734	763	139	361	471
Mean	3,216	3,266	3,317	3,211	3,110
Median	4	4	4	4	4
Mode	4	4	4	4	4
Min	0	0	0	0	0
Max	5	5	5	5	5
Lower Q	2	2	2	2	2
Upper Q	4	4	4	4	4
Variance	2,134	1,983	2,174	2,256	2,269
St. Dev.	1,461	1,408	1,475	1,502	1,506

It is worth noting that the opinions of teachers with experience in using AI (approximately 74% of respondents) were generally different when asked whether they were ready to recommend AI to their colleagues and students. The NPS method allowed us to divide the teacher respondents into three groups: promoters (those who rated their readiness level to recommend AI at 9–10 points), neutrals (7–8 points), and AI critics (0–6 points) (Fig. 3). The results show that the willingness to recommend AI to colleagues is 36%, which is slightly higher than the willingness to recommend AI to students, which is 35%. The group of teachers

criticising the use of AI by students is also larger – 41%, whereas the group criticising the use of AI by teachers is 35%. Thus, the calculated NPS index (% Promoters – % Critics) is +1 % (teachers recommending the AI use to colleagues) and -6% (teachers recommending the AI use to students).

Table 4

Non-parametric Kruskal-Wallis test values for the survey results in different regions

Region	Central and North	South	East	West
Have you encouraged students to use AI?: H (3, N= 1734) =1,488 p =0,685				
Valid N	471	763	361	139
Mean Rank	865,4	874,6	872,3	823,1
How successful was your experience with AI if you have tried using it?: H (3, N= 1280)=3,359 p=0,3395				
Valid N	346	563	272	99
Mean Rank	625,9	659,2	624,5	629,1
Do you agree with the statement „Artificial intelligence will change the educational process in the coming years"?: H (3, N= 1734)=3,645 p =0,303				
Valid N	471	763	361	139
Mean Rank	834,2	879,1	870,9	907,9

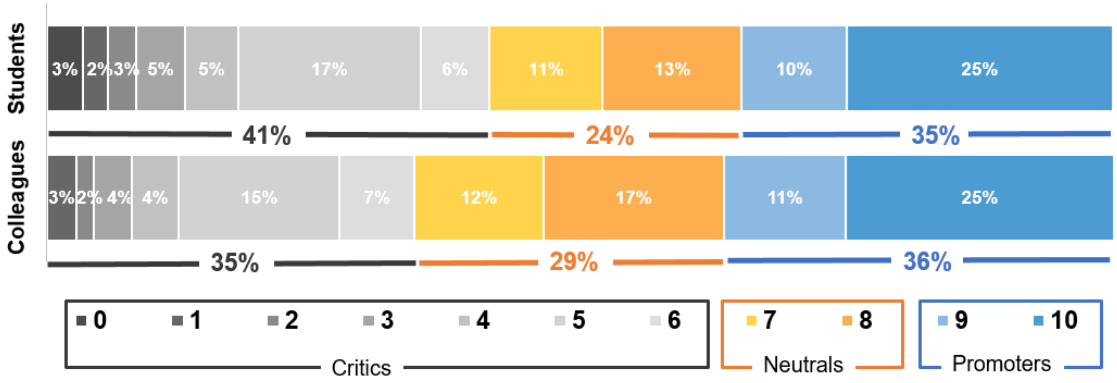

Figure 3. Willingness to recommend AI to other teachers and students

The answers to the open-ended questions allowed us to outline different concerns that teachers have about AI and their willingness to recommend it. For example, some respondents noted that older teachers are not ready to learn AI or that not all schools have the technical capabilities to use AI. However, teachers are most often reluctant to recommend AI services to colleagues because they are not familiar with or have no experience using such services in their work. The main reasons for the reluctance to recommend AI to other teachers include difficulties with AI use (limitations, errors in operation), the inability to substitute human communication and a real teacher, and fears that AI will limit human/teacher development.

The reasons for not recommending AI to students are largely the same as those for the reluctance to recommend AI to teachers; however, there are some specifics. Much stronger are the concerns that the use of AI services will have a negative impact on the development of students' thinking or even lead to its degradation. Another barrier is the fear that students will use AI to cheat, thus increasing the risk of academic dishonesty.

Teachers who are ready to recommend using artificial intelligence primarily point out that AI is an intrinsic part of modern life with an innovative force that will ensure further development. An equally important factor in recommending AI to their colleagues is the understanding that AI facilitates and supports the teacher's work and adds convenience and efficiency. Ultimately, teachers say that it optimises time and saves time, enabling them to

manage it more efficiently, including for personal purposes. Another key factor frequently mentioned by teacher promoters of AI is its ability to make the learning process interesting and engaging.

The reasons for recommending AI to students are similar to the reasons for recommending AI to teachers, but teachers also noted that the use of AI by students would contribute to their development. For example, it will develop critical thinking, teach them how to process information, analyse, broaden their horizons, help them to be creative in solving problems, teach them how to ask questions and analyse answers, etc.

An analysis of the relationship between teaching experience and the willingness to recommend AI to colleagues and students reveals no significant differences across age groups of teachers familiar with AI tools. The non-parametric Spearman and Kendall Tau rank correlation coefficients, calculated for the responses to the questions "Please rate from 0 to 10 the likelihood that you will recommend the use of AI to other teachers" and "Please rate from 0 to 10 the likelihood that you will recommend the use of AI to your students", confirm the absence of a significant correlation between teaching experience and the likelihood of recommending AI use. The rank correlation analysis shows weak negative correlations, none of which are statistically significant at $p<0,05$. For recommending AI to colleagues, the Spearman correlation is -0,073, and the Kendall Tau correlation is -0,057. For recommending AI to students, the Spearman correlation is -0,017, and the Kendall Tau correlation is -0,009. These findings indicate that teaching experience, and by extension the age of respondents with AI experience, does not meaningfully affect their willingness to recommend AI to either colleagues or students.

3.2. Students' Attitudes towards AI Use

The survey revealed that nearly all students were familiar with AI services, with less than 1% reporting no knowledge of any existing tools. Furthermore, 78% had used at least one AI service in the six months prior to the survey. Social networks were the leading source of information on AI services, cited by 80% of respondents. Additionally, 43% received AI-related information from friends or classmates, while 27% independently searched for it. Notably, only 24% of students mentioned receiving information about AI at school.

The most recognized AI tool among students was ChatGPT, which was familiar to 73%. In contrast, only 33% were aware of AI tools within the Na Urok project. Other services like Grammarly, Bard, Google, Midjourney, Notion AI, and Stable Diffusion were less popular, with fewer than 25% of respondents having heard of any of them.

Among students with AI experience, 75% had a positive impression, 18% were neutral, and only 7% had negative feedback. There was a clear trend of increasing AI knowledge and usage with age. For instance, 11th-grade students were the most proactive in searching for AI information and had the highest familiarity with tools like ChatGPT, Grammarly, Midjourney, and Notion AI. However, Na Urok was more popular among 8th and 9th graders.

Over 60% of students reported using AI services to complete homework, and about 40% had used AI in class, particularly for individual assignments.

Beyond education, students also used AI for self-development and idea generation. Interestingly, while 31% of students used AI weekly, 60% reported infrequent use, and 9% indicated no experience or interest in AI tools.

Quantitative data on AI usage frequency, success of AI experiences, and perceived impact on education are detailed in Table 5 (by grade level) and Table 6 (by region). These tables present the results of Likert scale responses, offering insights into students' interactions with AI tools across different demographics.

Table 5

Descriptive statistics of students' Likert scale responses on AI usage frequency, impressions, and perceived impact on education, categorized by grade level

Statistics	All responses	Grade 8	Grade 9	Grade 10	Grade 11
How often do you use AI tools? (Cannot say – 0; I haven't used it and don't plan to use – 1; I haven't used it but I plan to use – 2; Only once – 3; Literally a few times – 4; Regularly (every week) – 5)					
Valid N	1448	365	385	355	343
Mean	3,665	3,079	3,153	3,530	3,656
Median	4	4	4	4	4
Mode	5	5	5	5	5
Min	0	0	0	0	0
Max	5	5	5	5	5
Lower Q	3	1	2	3	3
Upper Q	5	4	4	5	5
Variance	2,049	3,194	2,896	2,691	2,215
St. Dev.	1,431	1,787	1,702	1,640	1,488
How successful was your experience with artificial intelligence if you have tried it? (Cannot say – 0; Not at all successful: I have a disappointing experience with AI – 1; Not really successful: I encountered some problems and challenges – 2; Neutral: I have not yet identified the benefits of AI – 3; Successful: AI has helped me a bit, but no exciting stories so far – 4; Great: AI has helped me a lot in my studies/other areas – 5)					
Valid N	1292	323	328	328	313
Mean	3,998	3,892	4,006	4,021	4,073
Median	4	4	4	4	4
Mode	5	5	5	5	5
Min	1	1	1	1	1
Max	5	5	5	5	5
Lower Q	3	3	3	4	4
Upper Q	5	5	5	5	5
Variance	1,043	1,190	0,985	1,048	0,940
St. Dev.	1,021	1,091	0,992	1,024	0,970
Do you agree or disagree with the statement "Artificial intelligence will have an impact on schooling in the coming years"? (Cannot say – 0; Completely disagree – 1; Rather disagree – 2; Neutral attitude – 3; Rather agree than disagree – 4; Completely agree – 5)					
Valid N	1448	365	385	355	343
Mean	3,346	3,438	3,629	3,763	3,845
Median	4	4	4	4	4
Mode	5	5	5	5	5
Min	0	0	0	0	0
Max	5	5	5	5	5
Lower Q	2	3	3	3	3
Upper Q	5	5	5	5	5
Variance	2,812	2,467	2,010	1,803	1,821
St. Dev.	1,677	1,571	1,418	1,343	1,349

The calculated Kruskal-Wallis criteria in Table 7 confirm statistically significant differences in the frequency of AI tools used in different grades and the level of agreement with the statement that AI will soon significantly impact the educational process, as the obtained p-values are lower than 0,05. The used criterion does not confirm the difference between different age groups regarding the success of using AI (p=0,225, which is higher than the significance level of p=0,05). However, the rank correlation analysis using Spearman and Kendall Tau coefficients shows a statistically significant (p<0,05) weak positive correlation between students' year of study and their responses regarding AI tool usage frequency (the Spearman correlation is 0,138, and the Kendall Tau correlation is 0,114), perceived success (the Spearman

correlation is 0,057, and the Kendall Tau correlation is 0,048), and agreement with the statement that AI will soon impact education (the Spearman correlation is 0,104, and the Kendall Tau correlation is 0,087).

Table 6

Descriptive statistics of students' Likert scale responses on AI usage frequency, impressions, and perceived impact on education, categorized by regions

Statistics	All responses	Central and North	South	East	West
How often do you use AI tools? (Cannot say – 0; I haven't used it and don't plan to use – 1; I haven't used it but I plan to use – 2; Only once – 3; Literally a few times – 4; Regularly (every week) – 5)					
Valid N	1448	656	265	388	139
Mean	3,346	3,360	3,185	3,343	3,597
Median	4	4	4	4	4
Mode	4	4	4	4	4
Min	0	0	0	0	0
Max	5	5	5	5	5
Lower Q	2	2	2	2	4
Upper Q	5	5	4	5	5
Variance	2,812	2,731	2,818	3,115	2,286
St. Dev.	1,677	1,653	1,679	1,765	1,512
How successful was your experience with artificial intelligence if you have tried it? (Cannot say – 0; Not at all successful: I have a disappointing experience with AI – 1; Not really successful: I encountered some problems and challenges – 2; Neutral: I have not yet identified the benefits of AI – 3; Successful: AI has helped me a bit, but no exciting stories so far – 4; Great: AI has helped me a lot in my studies/other areas – 5)					
Valid N	1292	580	238	344	130
Mean	3,998	4,016	3,975	3,980	4,008
Median	4	4	4	4	4
Mode	5	5	5	4	5
Min	1	1	1	1	1
Max	5	5	5	5	5
Lower Q	3	3	3	3	3
Upper Q	5	5	5	5	5
Variance	1,043	1,076	1,020	1,070	0,891
St. Dev.	1,021	1,037	1,010	1,034	0,944
Do you agree or disagree with the statement "Artificial intelligence will have an impact on schooling in the coming years"? (Cannot say – 0; Completely disagree – 1; Rather disagree – 2; Neutral attitude – 3; Rather agree than disagree – 4; Completely agree – 5)					
Valid N	1448	656	265	388	139
Mean	3,665	3,692	3,630	3,626	3,712
Median	4	4	4	4	4
Mode	5	5	4	5	4
Min	0	0	0	0	0
Max	5	5	5	5	5
Lower Q	3	3	3	3	3
Upper Q	5	5	5	5	5
Variance	2,049	2,073	1,863	2,167	1,989
St. Dev.	1,431	1,440	1,365	1,472	1,410

Table 7

Results of the non-parametric Kruskal-Wallis test for the survey data by different grade levels of respondents

Grade level	Grade 8	Grade 9	Grade 10	Grade 11
How often do you use AI tools?: H (3, N= 1448) =31,483 p =0,000				
Valid N	365	385	355	343
Mean Rank	663,7	671,6	777,5	793,7
If you have ever used artificial intelligence, please share your impressions: H (3, N= 1292) =4,3598 p =0,225				
Valid N	323	328	328	313
Mean Rank	614,5	644,9	656,8	670,4
Do you agree or disagree with the statement "Artificial intelligence will have an impact on schooling in the coming years"? H (3, N= 1448) =15,725 p =0,001				
Valid N	365	385	355	343
Mean Rank	667,9	708,3	745,3	781,3

The Kruskal-Wallis test results (Table 8) for the samples of respondents from different regions of Ukraine demonstrate no statistically significant differences in the frequency of AI tools use, the level of satisfaction with AI tools use, and the level of agreement with the statement that AI will soon have a significant impact on the educational process (p>0,05).

Table 8

Results of the non-parametric Kruskal-Wallis test for the survey data by different regions of respondents' residence

Region	Central and North	South	East	West
How often do you use AI tools?: H (3, N= 1448) =6,511 p =0,089				
Valid N	656	256	388	139
Mean Rank	726,6	673,9	739,3	769,6
If you have ever used artificial intelligence, please share your impressions: H (3, N= 1292) =0,769 p =0,857				
Valid N	580	238	344	130
Mean Rank	655,8	635,4	641,7	638,3
Do you agree or disagree with the statement "Artificial intelligence will have an impact on schooling in the coming years"? H (3, N= 1448) =1,924 p =0,588				
Valid N	656	265	388	139
Mean Rank	736,2	699,2	716,9	738,8

In general, this study has identified some basic patterns in the awareness of AI services among Ukrainian teachers and students. The most popular AI service, which is well-known to both target audiences, is ChatGPT. Awareness of it is slightly higher among students than teachers (73% vs. 69%, respectively). The second most widely known tool is the AI tool developed within the Na Urok project. 48% of teachers are familiar with this service, while the level of knowledge among students is lower. i.e. 36%. Both teachers and students are much less aware of such AI services as Grammarly, Bard Google, Midjourney, Notion AI, and Stable Diffusion.

Regarding the use of technology in the educational process, the majority of teachers and students said they had experience using AI services. In most cases, users were satisfied with the experience. Teachers said they used AI services to prepare for classes, create homework tests, conduct classes, and test students' knowledge, as well as in extracurricular activities. Some

teachers also involved students in the use of AI. When describing their experience with AI, students most often mentioned its help in preparing homework.

The study confirmed the ambivalent attitude of teachers towards AI. On the one hand, they understand that it is the latest technology and can be useful, but on the other hand, they have some concerns due to potential problems. Teachers are worried that AI may limit students' development and lead to cheating and unethical use. There is also the fact that teachers themselves do not yet fully understand how AI works, and they fear mistakes in its operation, as the technology is still developing and is not sufficiently understood.

Teachers have reason to be concerned about academic dishonesty, as some students surveyed do admit to using AI for this purpose. However, the majority of students believe that AI can, on the contrary, improve students' learning and development and make the educational process interesting and engaging. Students even express a desire to receive information from teachers on how to use AI ethically, its advantages and disadvantages, and how to apply it. The obtained patterns are fair for students and teachers in different regions of Ukraine, i.e., geographical factors, particularly the distance to the territories where active hostilities are taking place, do not have a decisive influence.

4. CONCLUSIONS AND PROSPECTS FOR FURTHER RESEARCH

The results of the Ukrainian survey lead to the conclusion that today, AI is an additional option for education, which tends to become a necessity in the future due to the rapid development, spread and high potential of technologies offered by AI for education. Today, AI helps teachers with routine tasks such as selecting the right analogy to explain processes, phenomena, and laws, preparing tests and reviewing the results, developing creative tasks, etc. AI can also customise the educational process: develop a curriculum considering the "gaps" in the student's knowledge, their temperament, time spent on acquiring new knowledge, their interests, motivation, etc. Of course, humans can do this, but the issue here is work efficiency. With individual instruction, it is possible; however, if the teacher has to deal with seven classes with 30 students in each, it is physically impossible for them to perform all these tasks. Undoubtedly, AI will eventually become a necessary tool in education and other fields. This technology is already widely used in marketing, healthcare, transport logistics, social media, and military affairs (e.g., UAV programming, and de-mining). The country that will master AI tools most effectively and quickly will have an economic advantage, as education is the key to success in the modern world.

Speaking about the potential negative consequences of AI use by students, it is worth mentioning similar discussions that took place in the 2000s regarding using personal computers. Nowadays, electronic devices have become an integral part of our daily lives, serving a variety of purposes, including ordering services, conducting online lessons, interacting with friends, etc. Similarly, artificial intelligence rapidly develops into an essential tool that facilitates various aspects of life. However, both PC and AI use raise some concerns about the impact on communication and collaboration skills. Although the communication formats may change, including elements of text messages, emojis, short videos, etc., the essence of communication remains the same, as people need to interact, socialise and support each other. The format may evolve in this context, but the basic needs and communication mechanisms remain unchanged. Although a change in the communication format is somewhat harmful, it is a logical consequence of scientific and technological development. Therefore, we should perceive this process as an objective reality of our time and look for ways to adapt and interact with it, especially in the educational field. The key questions here relate to the purpose and approach to AI technology use. There should definitely be a restriction on the time a student can spend in front of the monitor. It is also essential to develop students' critical and creative thinking, as

the information provided by AI is not always complete and accurate. Students should understand what AI relies on when it makes conclusions or generalisations, what it uses as the primary source of information, etc. AI can help students find information, but they must decide on their own what data is reliable. The authors believe that teachers need to be trained and provided with high-quality tools to ensure the beneficial effect of AI use on children's development. A teacher has obtained the professional training to make decisions on how to develop a particular student's competencies. Therefore, the task is twofold: to develop tools for education and to retrain as many educators as possible.

The study's limitations are due to the structure of the questionnaires used for the survey. In particular, the questionnaires did not contain questions about respondents' gender, both students and teachers. However, it should be noted that neither the organisers of the survey nor the authors of this publication set out to take gender aspects into account. In addition, the questionnaire design had some limitations: some questions were not marked as mandatory, which led to missing values. There is also an age limit for students, namely 14 years and older (8-11th graders). This, in turn, can lead to a bias in the estimates of the studied indicators and the inability to extrapolate the results and conclusions to students of all age categories. For some disciplines, there were too few responses to conduct statistical analysis. The relatively small number of responses from students and/or teachers in some regions (e.g. Ivano-Frankivsk, Vinnytsia, Chernivtsi, Poltava), as well as the impossibility of surveying respondents in the territories temporarily occupied by Russia, reduces the reliability of extrapolating the generalised results.

To overcome these limitations, future research could include larger and more diverse samples of respondents for similar surveys. The structured and systematic questionnaires will allow for a more transparent study, both the aspects already addressed and those not yet addressed.

REFERENCES (TRANSLATED AND TRANSLITERATED)

[1] L. Chen, P. Chen, and Z. Lin, "Artificial intelligence in education: A review," *IEEE Access*, vol. 8, pp. 75264–75278, 2020. doi: 10.1109/ACCESS.2020.2988510. (in English)

[2] D. Baidoo-Anu and L. O. Ansah, "Education in the era of generative artificial intelligence (AI): Understanding the potential benefits of ChatGPT in promoting teaching and learning," *Journal of AI*, vol. 7, no. 1, pp. 52–62, 2023. doi: 10.61969/JAI.1337500. (in English)

[3] S. Pacheco-Mendoza, C. Guevara, A. Mayorga-Albán, and J. Fernández-Escobar, "Artificial intelligence in higher education: A predictive model for academic performance," *Education Sciences*, vol. 13, no. 10, p. 990, 2023. doi: 10.3390/EDUCSCI13100990. (in English)

[4] N. Yannier, S. E. Hudson, and K. R. Koedinger, "Active learning is about more than hands-on: A mixed-reality AI system to support STEM education," *International Journal of Artificial Intelligence in Education*, vol. 30, pp. 74–96, 2020. doi: 10.1007/s40593-020-00194-3. (in English)

[5] A. Bozkurt, A. Karadeniz, D. Baneres, A. E. Guerrero-Roldán, and M. E. Rodríguez, "Artificial intelligence and reflections from educational landscape: A review of AI studies in half a century," *Sustainability*, vol. 13, no. 2, 2021. doi: 10.3390/su13020800. (in English)

[6] Z. Bahroun, C. Anane, V. Ahmed, and A. Zacca, "Transforming education: A comprehensive review of generative artificial intelligence in educational settings through bibliometric and content analysis," *Sustainability*, vol. 15, no. 17, 2023. doi: 10.3390/su151712983. (in English)

[7] C. Adams, P. Pente, G. Lemermeyer, and G. Rockwell, "Ethical principles for artificial intelligence in K-12 education," *Computers and Education: Artificial Intelligence*, vol. 4, p. 100131, 2023. doi: 10.1016/J.CAEAI.2023.100131. (in English)

[8] S. Akgun and C. Greenhow, "Artificial intelligence in education: Addressing ethical challenges in K-12 settings," *AI and Ethics*, vol. 2, no. 3, pp. 431–440, 2022. doi: 10.1007/s43681-021-00096-7. (in English)

[9] E. A. Alasadi and C. R. Baiz, "Generative AI in education and research: Opportunities, concerns, and solutions," *Journal of Chemical Education*, vol. 100, no. 8, pp. 2965–2971, 2023. doi: 10.1021/acs.jchemed.3c00323. (in English)

[10] J. Borenstein and A. Howard, "Emerging challenges in AI and the need for AI ethics education," *AI and Ethics*, vol. 1, no. 1, pp. 61–65, 2020. doi: 10.1007/S43681-020-00002-7. (in English)
[11] F. Ouyang, T. A. Dinh, and W. Xu, "A systematic review of AI-driven educational assessment in STEM education," *Journal for STEM Education Research*, vol. 6, no. 3, pp. 408–426, 2023. doi: 10.1007/S41979-023-00112-X. (in English)
[12] Y. O. Sisilitsyn and V. V. Osadchyi, "Using ChatGPT in distance learning for beginners in programming," *Information Technologies and Learning Tools*, vol. 97, no. 5, pp. 167–180, 2023. doi: 10.33407/itlt.v97i5.5277. (in Ukrainian)
[13] S. M. Lin, H. H. Chung, F. L. Chung, and Y. J. Lan, "Concerns about using ChatGPT in education," in *Lecture Notes in Computer Science*, pp. 37–49, 2023. doi: 10.1007/978-3-031-40113-8_4. (in English)
[14] A. Nguyen, H. N. Ngo, Y. Hong, B. Dang, and B. P. T. Nguyen, "Ethical principles for artificial intelligence in education," *Education and Information Technologies*, vol. 28, no. 4, pp. 4221–4241, 2023. doi: 10.1007/S10639-022-11316-W. (in English)
[15] X. Zhai et al., "A review of artificial intelligence (AI) in education from 2010 to 2020," *Complexity*, vol. 2021, Article 8812542, 2021. doi: 10.1155/2021/8812542. (in English)
[16] P. R. Córdova and R. M. Vicari, "Practical ethical issues for artificial intelligence in education," *Communications in Computer and Information Science*, vol. 1720, pp. 437–445, 2022. doi: 10.1007/978-3-031-22918-3_34. (in English)
[17] W. Holmes and I. Tuomi, "State of the art and practice in AI in education," *European Journal of Education*, vol. 57, no. 4, pp. 542–570, 2022. doi: 10.1111/EJED.12533. (in English)
[18] *Recommendation on the Ethics of Artificial Intelligence - UNESCO Digital Library*, 2021. [Online]. Available: https://unesdoc.unesco.org/ark:/48223/pf0000380455.locale=en. [Accessed: Jun. 3, 2024]. (in English)
[19] L. Londar and M. Pietsch, "Providing distance education during the war: The experience of Ukraine," *Information Technologies and Learning Tools*, vol. 98, no. 6, pp. 31–51, 2023. doi: 10.33407/itlt.v98i6.5454. (in English)
[20] O. Ovcharuk, I. Ivaniuk, and M. Leshchenko, "Impact of school lockdown on access to online instruction during the war in Ukraine," *European Journal of Education*, vol. 58, no. 4, pp. 561–574, 2023. doi: 10.1111/EJED.12589. (in English)
[21] V. Kremen, "Education in Ukraine defies the war," *European Journal of Education*, vol. 58, no. 4, pp. 538–541, 2023. doi: 10.1111/EJED.12597. (in English)
[22] *State budget for 2023: Expenditure on education and science*, Ministry of Education and Science, 2023. [Online]. Available: https://mon.gov.ua/news/derzhbyudzhet-na-2023-rik-vidatki-na-osvitu-ta-nauku. (in Ukrainian)
[23] S. Dovgyi, V. Nebrat, D. Svyrydenko, and S. Babiichuk, "Science education in the age of industry 4.0: Challenges to economic development and human capital growth in Ukraine," *Naukovyi Visnyk Natsionalnoho Hirnychoho Universytetu*, no. 1, pp. 146–151, 2020. doi: 10.33271/NVNGU/2020-1/146. (in English)
[24] L. M. Hrynevych, N. V. Morze, and M. A. Boiko, "Scientific education as the basis for innovative competence formation in the conditions of digital transformation of the society", *Information Technologies and Learning Tools*, vol. 77, no. 3, pp. 1–26, 2020, doi: 10.33407/itlt.v77i3.3980. (in Ukrainian)
[25] *NaUrok. Personal Assistant AI*, 2024. [Online]. Available: https://naurok.com.ua/assistant. [Accessed: Jun. 2, 2024]. (in Ukrainian)
[26] F. Reichheld, "The one number you need to grow," *Harvard Business Review*, vol. 81, pp. 46–54, 2004. (in English)
[27] A. Kara, A. Mintu-Wimsatt, and J. E. Spillan, "An application of the net promoter score in higher education," *Journal of Marketing for Higher Education*, 2021. doi: 10.1080/08841241.2021.2018088. (in English)

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СТАВЛЕННЯ ВЧИТЕЛІВ ТА УЧНІВ ДО ВИКОРИСТАННЯ ШТУЧНОГО ІНТЕЛЕКТУ: ВСЕУКРАЇНСЬКЕ ДОСЛІДЖЕННЯ

Станіслав Довгий
доктор фізико-математичних наук, професор,
академік Національної академії наук України,
Президент Малої академії наук України, м. Київ, Україна

ORCID ID 0000-0003-1078-0162
gis_rs@man.gov.ua

Світлана Бабійчук
докторка педагогічних наук,
запрошена дослідниця у Гарвардській школі вищої освіти,
Гарвардський університет, штат Массачусетс, США
ORCID ID 0000-0001-6556-9351
brevus.lana@gmail.com

Лідія Давибіда
кандидат геологічних наук, доцент,
доцент кафедри геодезії та землеустрою,
Івано-Франківський національний технічний університет нафти і газу, м.Івано-Франківськ, Україна;
методист лабораторії "ГІС та ДЗЗ",
Національний центр "Мала академія наук України", м.Київ, Україна
ORCID ID 0000-0002-9796-7124
davybida.li@gmail.com

Марія Білецька
виконувач обов'язків завідувача лабораторії "ГІС та ДЗЗ"
Національний центр "Мала академія наук України", м. Київ, Україна
ORCID ID 0009-0002-1752-1438
mr.biletska@gmail.com

Анотація. Стрімке поширення використання штучного інтелекту (ШІ) у різних сферах, особливо в освіті, знаменує трансформаційний період для цієї галузі. Критично важливо розуміти основну роль учителів і учнів як активних учасників цього процесу, а також чинники, що впливають на їхні уявлення та ставлення до ШІ. В Україні поява та швидке поширення доступних інструментів ШІ відбулось під час повномасштабного військового конфлікту, який спричинив серйозні порушення традиційних освітніх процесів. Це дослідження надає уявлення про ці впливи, аналізуючи результати проведеного у 2023 році загальнонаціонального опитування щодо ролі ШІ в освіті, яке охопило дві основні групи: освітян (N = 1734) та учнів 8–11 класів (N = 1448). Дані виявляють суттєві відмінності у ставленні вчителів та учнів до інтеграції ШІ в навчальний процес. Багато вчителів визнають потенціал ШІ у виконанні таких завдань, як створення тестів, розробка творчих завдань та відстеження прогресу учнів, однак вони також висловлюють занепокоєння щодо етичних аспектів і ризиків академічної недоброчесності. Натомість значна частина учнів розглядає ШІ як цінний інструмент для покращення навчання та сприяння самоосвіті. Крім того, дослідження виявило обернену залежність між тривалістю професійного досвіду вчителя та частотою використання ним ШІ, що може свідчити про більшу готовність молодших педагогів впроваджувати ці технології. Серед учнів натомість виявлено позитивний зв'язок між роком навчання та частотою використання інструментів ШІ, що вказує на поступове збільшення зацікавленості в ШІ з переходом у старші класи. На основі отриманих результатів можна зробити висновок, що ШІ наразі є додатковою опцією для освітніх заходів, яка в найближчому майбутньому стане необхідністю. Тому перепідготовка та підвищення кваліфікації вчителів і забезпечення їх відповідними якісними інструментами є важливим і нагальним завданням.

Ключові слова: штучний інтелект; освітній процес; опитування; статистичний аналіз; чинники; педагогічний стаж; клас.