How often do University Students use Artificial Intelligence in Their Studies?

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Abstract: - This study deals with the use of Information and Artificial Intelligence technologies with education. The purpose is to investigate students' use of Artificial Intelligence (AI) in their studies. The authors have used a survey of 882 Ukrainian university students, graphical and tabular result presentation, t-statistics, and z-statistics with a high significant level of 0.01. The authors have found out that students use AI in their learning process: every day 8.0% − 31.0%, 3-4 times/week 6.0% - 15.0%, 1-2 times/week 17.0% - 20.0%, 1-2 times/month 14.0% - 40.0%, never 20.0% - 29.0%. Research novelty is: confirming two Research hypotheses, new scientific facts about the use of AI technologies in the learning process, and the absence of the need to develop proposals for improving the teaching process using AI technologies because university teachers provide students with a real-world AI-enabled environment that is adequate for student needs in their studies. The results are very important for monitoring the use of AI in higher education. The new data can help to make management decisions to achieve high-quality education. The new research findings contribute to the growing debate on the integration of information technology, computers, and AI technologies in education.

Key-Words: - Information technology, information sciences, Artificial Intelligence, AI-technology, ChatGPT, education, Ukrainian universities, students' perception, students' needs.

1 Introduction

The use of information technologies in education includes not only technical devices and software but also the use of them by students in the educational process. This article was influenced by a paper published earlier, [1]. This article deals with utilizing computers in education through the use of such innovation as Artificial Intelligence (AI). AI technologies are becoming more widespread in various spheres of economic and social life, [2], [3], [4], [5].

Among other things, AI technologies are increasingly being used in education, [6], [7], [8], [9], [10], [11], [12], [13]. For example, the authors of the paper [6] tried to understand teachers' perceptions of education in the field of AI convergence, since they are important personnel for education. The author of another article [8] highlights the importance of the potential benefits of AI tools in general and specific educational practice. One more research [11] described AI-Virtual Trainer as an educational system that uses artificial intelligence to offer varied lessons. The results prove that Artificial Intelligence-Virtual Trainer meets the requirements of this field, [11]. Therefore, papers, [2], [3], [4], [5], [6], [7], [8], [9], [10], [11], [12], [13] and others emphasize the importance of our study. In one of the enlisted papers [2], the authors attempt to understand the potential impact of generative AI technologies on developing countries, taking into account the potential paradigm shift in education, healthcare, and the environment. The results highlight the importance of providing the necessary support and infrastructure to ensure that generative AI contributes to inclusive development in developing countries, including Ukraine. The authors of the paper [3] asked ChatGPT to take several student tests. ChatGPT ranked in the 91st percentile in microeconomics and the 99th percentile in macroeconomics compared to students who took the exam at the end of the course. Thus, the results show that ChatGPT can produce answers that are superior to the average student's answers. These results highlight the importance of studying how students use AI technologies.

Students are active consumers of educational

services, [14], [15], [16]. In particular, another author has shown that being familiar with students' different learning styles can greatly assist teachers in improving the effectiveness of the teaching-learning process, [16]. Earlier, it was proved that in Eastern European universities, students are not subjects of educational services, [15]. This fact emphasizes the importance of studying student use of such innovation as AI technology in Ukraine.

So, their perceptions and attitudes toward AI technologies play an important role in determining the future of the educational system. Exploring students' views and predictions about artificial intelligence tools is a relevant research topic that provides insight into the issue of how often university students use AI in their studies.

In the paper [1], the authors have accepted the alternative hypothesis: "The number of students who think that AI is a threat to higher education in the next five years is more than 0.00%." This hypothesis was accepted with a standard level of significance of 0.05. In this paper, we changed our focus from the students' opinions to the real situation.

The purpose of this study is to investigate students' perceptions and utilization of AI technologies in their studies. This study involves conducting a questionnaire survey to identify how often university students use AI in their studies.

The results of this study may have an important practical significance for the development of the educational services market. The results obtained will allow universities to adapt their programs and teaching methods to the educational needs of students. The answer to this simple question gives us additional information about whether the practical activity of university teachers corresponds to the practice of using AI by students. The research aim is to test two research hypotheses.

Research hypothesis 1: Students use AI technology every day in their studies.

Research hypothesis 2: University teachers provide students with a real-world, AI-enabled environment that is adequate for student needs.

The smart growth of the economy is related to the study of the complexity of social processes and changes caused by the speed of application of digital technologies. The results of this paper help to unite the exchange of ideas, creation, development, and design of theoretical models and concepts, as well as the development of innovative methodological approaches to scientific research in the field of AI technologies and education.

2 Problem Formulation

The study [6] has provided us with important information for more effective teacher development with the help of using AI, especially in higher education.

In the paper [7], the authors studied the opinions of 599 students about the possibility of replacing university teachers with Artificial Intelligence technologies. The authors have shown that 10.85% of students of Eastern European universities are already sure that AI will replace university teachers in 5 years.

The authors of the paper [8] showed that the use of ChatGPT significantly improved the quality of individualized education program goals developed by aspiring teachers for children with autism.

The authors of the review [9] describe the application of big data at the micro level (such as attendance data), meso level (such as various texts), and macro level (such as institutional data). Micro-level data are often used to understand behavioral processes and cognitive strategies in order to personalize learning.

The results of the paper [10], show that the ease and usefulness of using ChatGPT increases the learning satisfaction of Ph.D. students and their individual benefits in the learning process.

The author of the paper [11] has created an AI-Virtual Trainer. It is an educational system that uses Artificial Intelligence to offer a variety of lessons to trainers. As required by pedagogical practice, the AI-Virtual Trainer never offers the same lesson twice, whereas the same pedagogical goal can be set many times in a row.

The purpose of another study [12] was to explore students' and teachers' perspectives on the benefits and challenges of using Artificial Intelligence (AI) tools. This qualitative methodological study included interviews with 8 students and 6 teachers.

In the following article, the author discusses the possibilities and limitations of using Artificial Intelligence in education. The author observed the institutionalization of new management practices in education based on digital technologies, [13].

The authors of the study [17] have successfully used the AI model to improve learning efficiency and accelerate Indonesian language acquisition.

The authors of these and other papers [6], [7], [8], [9], [10], [11], [12], [13], [17] study various aspects of using AI in education. However, they do not study the opinions of large groups of students. Among the only exceptions is the paper, [1].

In the studies [14], [15], [16] authors justify the attitude to students as buyers of educational

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processes (services). These authors emphasize the importance of taking into account the opinions of students. However, the authors of the works [1], [7] did not try to get an answer to the question of whether all 100% of students really take advantage of Artificial Intelligence. So, it is hypothetically possible that all students have a formed attitude towards AI, [1]. It is even possible that some of the students are convinced that AI will replace university teachers, [7]. However, it is statistically possible that they do not use this tool yet.

Countries from the Organization for Economic Cooperation and Development (OECD) proposed AI Principles in 2019, [18]. These are the standards designed to promote and uphold human rights in the face of AI innovation.

The authors of this article see a significant scientific problem in the need to assess how often students use AI technologies in their studies. The authors have assessed this based on the opinion of the students themselves.

3 Problem Solution

The study was carried out from April 2023 to May 2024 at the Khortytsia National Educational and Rehabilitation Academy. This study continued the previously started work on studying the quality of students' education using AI technologies, [19]. A direct solution to this research problem had technical and methodological difficulties. Therefore, the authors used a non-standard two-stage method for solving the research problem by measuring indirect parameters. In the first stage, the students' needs were measured, [19]. In the second stage, the authors investigated the real situation in the use of AI technologies in the learning process.

The Eastern European Scientific Group supported the study. The Ukrainian Government has decided to establish a nationwide Ukrainian Wellness Hub on the basis of the Academy, [20].

The authors used the following research methods, [21], [22], [23], [24], [25]: a literary review, a survey of university students, tabular and graphical representation of the results, t-statistics and z-statistics.

The principle approach to questionnaire design is described in papers [1], [7], [26]. In this article, the authors analyze the respondents' answers to a single question. This is the question No. 13, [26]: How often do you use Artificial Intelligence in your learning process?

A standard five-step Likert scale was used to process the responses, [27]. So, the question contains 5 answers on this scale: never, 1-2 times/month, 1-2 times/week, 3-4 times/week, every day.

3.1 Respondents
Firstly, the authors investigated the opinions of 882 students in the study.
Secondly, the respondents were selected randomly.
Thirdly, the questionnaire was completed electronically through the use of cloud technologies, [26].

The respondents represent students of the Khortytsia National Educational and Rehabilitation Academy (Ukraine). Table 1 shows some information about the respondents: M – male gender, F – female gender, O – other genders.

Table 1. Students

№	Faculty	F/M/ O	Number
1	Professional College (PC)	310/21/4	335
2	Faculty of RPSW	289/48/2	339
3	Faculty AD	168/40/0	208
	Sum	767/109/6	882

Table 1 shows that 882 Ukrainian higher education students participated in the survey. Of these, there were 109 male genders, 767 female genders, and 6 other genders. The age of the respondents ranged from 15 to 29 years. Gender and age differences are not important in our paper.

3.2 Statistical Hypotheses
A joint analysis of the verification of two Research hypotheses allows us to find an answer to the management question of whether it is necessary to take management measures to meet the needs of students in the use of AI technologies in the learning process.
It looks like this:

- If students use AI technologies in the learning process every day, then university teachers should also use AI technologies in the teaching process every day.

- If students do not use AI technologies in the learning process every day, then university teachers should not use AI technologies in the teaching process every day.

- If students do not use AI technologies in the learning process at all, then university teachers should motivate students to use AI technologies in the learning process.

Each of the Research hypotheses was transformed into two pairs of statistical hypotheses, [22], [23], [24], [25]. T-statistics was used for Null Hypothesis 1 and Alternative Hypothesis 1. Z-

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statistics was used for Null Hypothesis 2 and Alternative Hypothesis 2.

Null hypothesis 1: all students use AI technology in their learning every day.

Alternative Hypothesis 1: not all students use AI technology in their learning every day.

Null Hypothesis 1: $\mu_0 = 4.00\%$.

Alternative Hypothesis 1: $\mu_0 > 4.00\%$.

Null hypothesis 2: The needs of students and the amount of actual use of AI by students in their studies are equal to each other.

Alternative hypothesis 2: The needs of students and the amount of actual use of AI by students in their studies are not equal to each other.

Null Hypothesis 2: $M(x1) - M(x2) = 0.00$.

Alternative Hypothesis 2: $M(x1) - M(x2) \neq 0.00$.

The papers [22] and [25] were used for statistics and verification of statistical hypotheses. The high significant level of 0.01 was used by the authors. Also, the authors have provided that random deviations were not taken into account, [22], [23], [24].

For the research, hypothesis 1 a one-way check was used, [22], [23], [24].

For the research hypothesis 2 a two-way check was used, [22], [23], [24].

3.3 Graphical and Tabular Representation of the Results

The student answers are shown in Figure 1 (a, b, c). Figure 1 shows the distribution of student responses from different faculties according to a standard five-step Likert scale, [27].

Figure 1 shows that the number of answers for students of different faculties varies within the following limits:
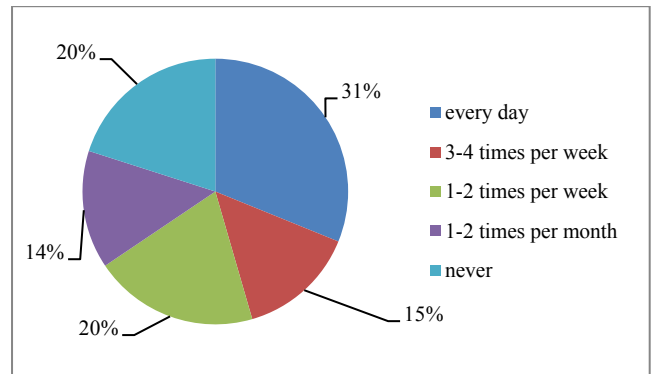
- every day: 8.0% – 31.0%,
- 3-4 week times/week: 6.0% - 15.0%,
- 1-2 week times/week: 17.0% - 20.0%,
- 1-2 times/month: 14.0% - 40.0%,
- never: 20.0% - 29.0%.

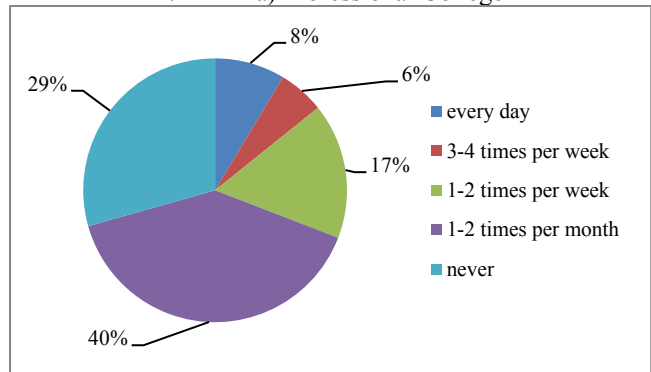The major part of the answers are "1-2 times/month" and "never."

The responses of the respondents are grouped in Table 2. The authors accepted the following data to digitize the responses:

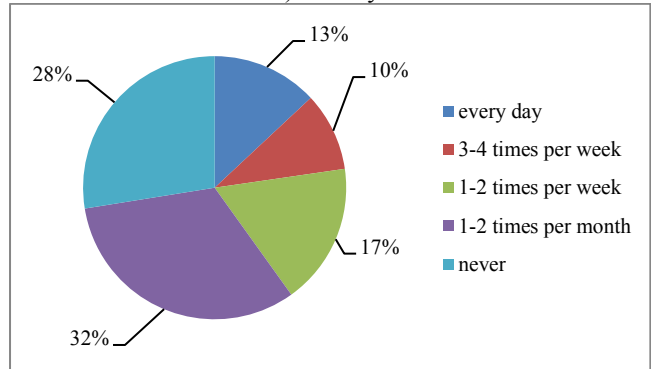- every day = 4.0,
- 3-4 times/week = 3.0,

- 1-2 times/week = 2.0,
- 1-2 times/month = 1.0,
- never = 0.0.

I.   a) Professional College

II.   b) Faculty of RPSW

III.   c) Faculty of AD

Fig. 1: Distribution of student answers to the question.

These numerical designations are used in Table 2. Here "N" is the sum of answers for students of each faculty.

Table 2. Responses of respondents

№	Faculty	Responses					N
		4.0	3.0	2.0	1.0	0.0	
1	PC	104	48	67	48	67	334
2	FRPSW	29	19	56	134	99	337
3	FAD	27	20	36	67	57	207
	Sum	160	87	159	249	223	878

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Table 2 shows that four respondents refused to answer the 13th question. Thus, the authors received 878 responses from students of three faculties.

Neither Figure 1 nor Table 2 allows for a statistically sound decision.

The statistical indicators (Mx and δ) are in Table 3. They were calculated using Artificial Intelligence according to the methodology described in the papers [25], [28] after digitization. This is another aspect of the non-standard method of solving the research problem that the authors of the manuscript used.

Table 3. Statistical indicators

№	Faculty	N	(Mx)	(δ)
1	PC	334	2.2216	1.5115
2	FRPSW	337	1.2422	1.1836
3	FAD	207	1.4831	1.3325
4	Sum	878	1.6729	1.1644

Table 3 shows the statistical indicators. They are a little different from each other. The value (δ) is always less than the value (Mx). This fact suggests that empirical data tend to be close to the value (Mx).

These statistical indicators are useful for t-statistics and z-statistics.

3.4 Verification of the First Pair of Statistical Hypotheses (t-statistics)

At this stage, the verification of statistical hypotheses was performed for Null Hypothesis 1 and Alternative Hypothesis 1.

Table 4. Verification of statistical hypotheses (comparing the average of the sample (Mx) with a given number $\mu_0 = 4.0$, one-way verification)

| №	Calculations	PC	FRPSW	FAD
1	Sample size, N	334	337	207
2	Average of the sample, (Mx)	2.2216	1.2422	1.4831
3	The standard deviation for sample, (δ)	1.5115	1.1836	1.3325
4	Average error, $\dot{S}_{\bar{X}} = (\delta) / \sqrt{n}$	0.0827	0.0645	0.0926
5	Value $\mid t_{stat} \mid$ for $\mu_0 = 4.00$ %, $[(Mx) - \mu_0] / \dot{S}_{\bar{X}}$	21.504	42.757	27.180
6	Value t_{tabl} for the high significant level of α (0.01)	2.326	2.326	2.326
7	$\mid t_{stat} \mid > t_{tabl}$	Yes	Yes	Yes

Table 4 shows the results of the verification. In Table 4, the authors assumed the condition $\mu_0 = 4.00$. The authors borrowed this condition from subsection 3.3 "Graphical and tabular representation of the results."

The results of t-statistics show the value of $\mid t_{stat} \mid$ is greater than the t_{tabl} for a given number ($\mu_0 = 4.00$) for each group of respondents (Table 4). In this case, the Alternative hypothesis should be accepted: Not all students use AI technologies in their learning every day. In a particular case, this is true about students of the Academy.

In this way, the results were obtained with a high significant level (0.01).

3.5 Verification of the Second Pair of Statistical Hypotheses (z-statistics)

At this stage, the verification of statistical hypotheses was performed for Null Hypothesis 2 and Alternative Hypothesis 2. The authors compared the amount of students' actual use of AI in learning (Figure 2) and the amount of students' needs to use AI in learning (Figure 3).
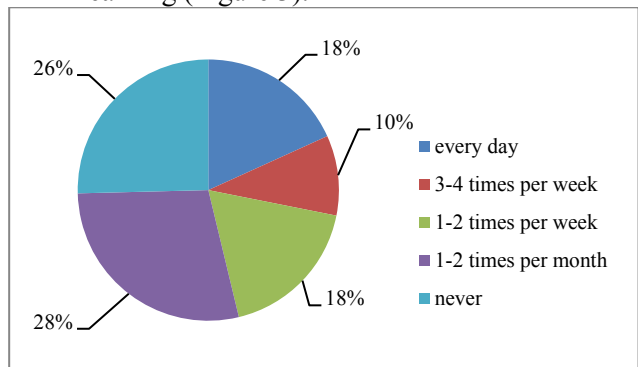
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Fig. 2: Amount of actual use of AI by students in their studies
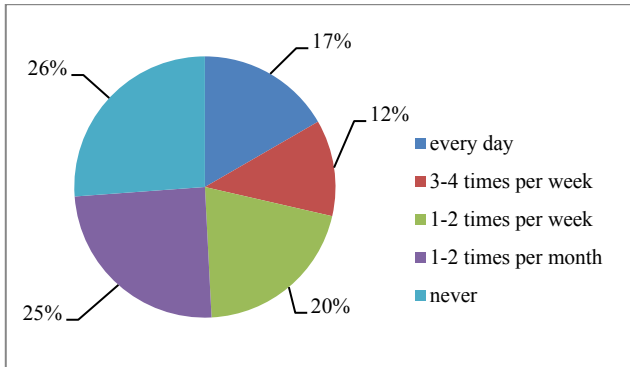
Figure 2 shows that the answers are:

● every day: 18.0%,

● 3-4 week times/week: 10.0%,

● 1-2 times/week: 18.0%,

● 1-2 times/month: 28.0%,

● never: 26.0%.

Figure 3 is based on data from the source [19] and Table 2.

Figure 3 shows that the following number of the answers:

● every day: 17.0%,

● 3-4 times/week: 12.0%,

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- 1-2 times/week: 20.0%,

- 1-2 times/month: 25.0%,

- never: 26.0%.

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Fig. 3: Students need to use Artificial Intelligence in their studies, [19]

Comparing Figure 2 and Figure 3 one can see that the number of "never" responses is the same. The number of other answers is close to each other. However, Figure 2 and Figure 3 do not allow for a statistically sound decision.

Based on data from Figure 3 and the source [1] and Table 2, the authors calculated statistical indicators characterizing students' needs for using AI in their studies (Table 5). The statistical indicators (Mx and δ) were calculated using Artificial Intelligence employing the methodology described in the papers [25], [28]. Also, Table 5 shows the results of the verification.

Table 5. Verification of statistical hypotheses (comparing the averages of two independent samples, two-way verification)

No	Calculations	The real use of AI	Students' needs
1	Size of a sample, N	878	864
2	Expected value, (Mx), %	1.6729	1.6840
3	$\| (M_1) - (M_2) \|$	0.0111	
4	$\mu_1 - \mu_2$	0.00	
5	The standard deviation for the sample, (δ)	1.1644	1.4102
6	Average error, $\dot{S}_{\bar{X}} = (\delta) / \sqrt{n}$	0.0393	0.0480
7	$\dot{S}_{\bar{X}}^2$	0.0015	0.0023
8	$\| \dot{S}_1^2 - \dot{S}_2^2 \|$	0.0008	
9	$\sqrt{(\dot{S}_1^2 - \dot{S}_2^2)}$	0.0283	
10	$\| z_{stat} \| = [(M_1) - (M_2) - (\mu_1 - \mu_2)] / \sqrt{(\dot{S}_1^2 - \dot{S}_2^2)}$	0.392	
11	Value z_{tabl} for the high significant level of 0.01	2.576	
12	Result, $\| z_{stat} \| > z_{tabl}$	No	

Z-statistics shows that the $\| Z_{stat} \|$ is less than the Z_{tabl} (Table 5). In this case, you are not able to reject the Null Hypothesis. So, Null Hypothesis 2 should be accepted: Students' needs and the size of actual students' use of AI in their studies are equal. In this way, the results were obtained with a high significant level (0.01).

This means that university teachers provide students with a real-world AI-enabled environment that is adequate for their needs. In a particular case, it is true about university teachers of the Khortytsia National Educational and Rehabilitation Academy.

3.6 Discussion

One of the most important reasons for performing the study is the ability of Artificial Intelligence to process huge amounts of data quickly and accurately, [29]. This fact requires the increasingly widespread use of information technologies and computers, including in the form of AI technologies in education.

Regarding the first research hypothesis, the authors obtained new scientific data in the form of 878 respondents' answers to question 13. Figure 1 shows that of the students surveyed, Artificial Intelligence is used in the learning process in this way:

- every day: 8.0% – 31.0%,

- 3-4 times/week: 6.0% - 15.0%,

- 1-2 times/week: 17.0% - 20.0%,

- 1-2 times/month: 14.0% - 40.0%,

- never: 20.0% - 29.0%.

These responses were first obtained and statistically analyzed. The respondents were students of three faculties. Their answers were not the same. For comparison, in the paper [19], the answers of Ukrainian students from different faculties also differ from each other. In the paper [19], its authors studied the students' answers to research question 8, [26]: How often do you need to use Artificial Intelligence in the learning process? Here, students from different faculties demonstrated different needs for using AI in the learning process. Thus, the "champions" in the size of students' need to use AI technologies were students from Professional Colleges, [19]. These same students became "champions" in the actual use of AI technologies in the learning process (Figure 1).

The work [7] shows that the opinions of Ukrainian students from different universities are close to each other, but are not the same [7].

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Comparison of the new data with the empirical data of an alternative source [6] does not make sense, since the source [6] only surveyed 20 respondents. The authors of the paper [3] normalized the responses of thousands of students from different institutions based on a 30-question assessment given at the beginning and end of the semester. However, these authors did not study the students' use of AI technologies. They only compared the students' and AI's responses during testing. The important paper [30] makes a significant contribution to the ongoing debate about integrating AI into education. However, its authors did not analyze empirical data.

When verifying statistical hypotheses, Null Hypothesis 1 and Alternative Hypothesis 1, the Alternative hypothesis should be accepted: Not all students use AI technologies in their learning every day.

Thus, it is statistically proven that not all students use AI technologies in their learning every day (Table 4). At least this is the case for students of each faculty of the Academy.

Regarding the second Research hypothesis, the authors also obtained new scientific data. It was obtained by using a non-standard method for solving the research problem. To do this, the authors compared the results of their own study with the results published earlier by another group of authors [19]. The needs of students were borrowed from the paper [19]. Table 6 shows the comparison of students' AI needs [19] and their real-life use of AI (Figure 2).

Table 6. Comparison of students' needs in using AI and its real use in their studies

Respondent answers	Students' AI needs [19]	Real-life use of AI (Fig. 2)
every day	17.0%	18.0%
3-4 times / week	12.0%	10.0%
1-2 times / week	20.0%	18.0%
1-2 times / month	25.0%	28.0%
never	26.0%	26.0%

This data (Table 6) was first obtained and analyzed statistically (Table 5). When verifying statistical hypotheses Null Hypothesis 2 and Alternative Hypothesis 2, the Null hypothesis should be accepted (Table 5): The needs of students and the amount of actual use of AI by students in their studies are equal to each other.

Thus, it is statistically proven that the needs of students and the amount of actual use of AI by students in their studies are equal to each other

(Table 5). This means that university teachers provide students with a real-world AI-enabled teaching process that is adequate for the students AI needs in the learning process (Figure 1). Thus, the joint analysis of the results of testing two Research hypotheses (1 and 2) helped to find an answer to the previously posed management question. Now you know that there is no need to take management measures to meet the needs of students in using AI technologies in the learning process.

At least this is true of higher education teachers of the Khortytsia National Educational and Rehabilitation Academy. The closest to this study is the paper, [7]. It was published in 2024. This paper describes the opinions of students from 6 Eastern European universities. They include students from 2 Ukrainian universities. Of course, those were answers to a different question and you can't compare the answers in the paper [7] to the answers in the other paper [1] or to our answers. So, you can assume and later check that the answers of Ukrainian students are close to each other. This allows you to make an assumption about the possibility of attributing the obtained results to the students of all Ukrainian universities.

The answers of students from Kazakhstan, Poland, and Slovakia [7] are very different from the answers of Ukrainian students, [7]. This fact does not allow us to attribute the obtained result to all students of Eastern European universities. Although the comparison of our results with the results of the paper [26] did not show a significant difference, the authors consider this as the first limitation of the study.

The scientific contribution of the manuscript is:
- in the use of a non-standard method for solving a research problem,
- in obtaining new scientific facts about the use of AI technologies in the learning process (Figure 1),
- in confirming two Research hypotheses,
- indirectly proving the absence of the need to develop proposals for improving the teaching process using AI technologies.

The practical significance of the new data leads to the recognition of the fact that higher education teachers of the Academy "keep up with the times". They provided the amount of AI used in the learning process (Figure 3) on a scale that statistically matched the students' needs, [19]. This means that the management of the Academy does not need to take emergency measures to improve the teaching process using AI technologies.

The relatively small number of students using AI in their learning process every day (8.0% - 31.0%, Figure 1) shows the vector for further

development of the Academy. This vector is a movement towards increasing the number of higher education teachers encouraging students to use AI technologies in their studies. Following this vector will eventually lead to an increase in the number of students using AI technologies in their studies every day.

The second limitation of the study is that no one can forecast at what speed the rate of implementation of AI technologies in higher education will grow.

The OECD Principles [31] on AI technologies encourage innovative and predictive AI. These Principles expect AI to respect human rights and democratic values.

Globally, the development and regulation of AI has become a matter of public concern, [18]. The desire to regulate AI in order to reduce the risk of harm to the public has spread to many countries. So, the author argues [32] "The EU is poised to effectively become the world's "AI police" by creating binding rules on transparency, ethics and more".

US President Biden signed an executive order [33] requiring US companies to inform the US Government of the results of their security tests before they release new AI models. The US government is initiating requirements that AI technology cannot be used to produce weapons, [34].

A number of ethical issues related to AI have arisen in Kenya, [35]. This has sparked interest in the regulation of AI [35] in a number of African countries. In October 2023, the participating countries of the most important AI summit (Chile) adopted the "Santiago Declaration", [36]. This Declaration emphasizes the concerted efforts of Latin American and Caribbean countries to develop governance and regulatory instruments tailored to the specificities of the region.

Australia was one of 28 countries and the EU to sign a declaration that AI poses a catastrophic risk to humanity [33] and must be used carefully, safely, and responsibly. However, some experts believe that Australia "lags behind" [33] when it comes to regulating AI technologies.

Southeast Asian countries, on the other hand, take a favorable approach to AI regulation, [37]. "The ASEAN AI Guidelines" require companies to take into account the cultural differences of countries and are voluntary, [37].

You see that different countries have different opinions on using and regulating AI technologies. When the world of science and practice finds an answer to the second limitation, you will be able to

make management decisions to align the teaching process with the needs of students in the use of AI technologies in the learning process.

The third limitation is related to the gender characteristics of the respondents. Table 1 shows that female respondents dominated the study. According to Table 1, you can accept the idea that male gender was underrepresented.

The fourth limitation is related to the age characteristics of the respondents. The authors failed to obtain new scientific facts for advanced students.

If you accept that the results obtained by the authors are close to the results of other Ukrainian higher education institutions, then you have the opportunity to forecast and plan the implementation of AI technologies in higher education throughout the country.

In any case, the new scientific data should be used in monitoring the use of AI technologies by higher education teachers and students. New research evidence contributes to the evolving debate about the integration of AI technologies in education, [30]. As AI continues to shape the educational environment, it is important to provide higher education teachers with all kinds of support, [6].

The authors used modern research methods, [20], [21], [22], [23], [24], [25], [26]. A standard five-step Likert scale [27], [28] was employed to process the responses. In combination with modern statistics [22], [23], [24] this ensures the reliability of the results obtained. The results were obtained with a high significant level (0.01).

4 Conclusion

This study has important scientific and practical implications for the use of AI technologies in education.

In this study, the authors verified two research hypotheses and obtained new scientific facts on the use of computers, software, and AI technologies in education.

Firstly, the authors have statistically proven that not all students use AI technologies in learning every day. This scientific result is obtained directly. Now you know the number of students (in percentages) who use AI technologies on a daily basis, often, rarely, or never. Based on the new scientific data, you can plan both the current learning process and its development in the near future.

Secondly, the authors statistically proved that the needs of students and the amount of actual use of AI in their studies are equal to each other. The

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second hypothesis was verified by comparing the empirical data with the results published previously. This result was obtained indirectly. Now you know that university teachers of the Academy meet the needs of students in AI technologies. In other words, they are in line with an adequate innovation policy. They provide students with an educational environment in which the need of students to use AI technologies in their studies are met. This means that within the scope of the study, the use of AI technology in the teaching process has a positive impact on the quality of higher education by meeting the needs of students.

Although this study has several positive implications, it has four limitations:

1. The number of respondents does not allow us to attribute the obtained result to all students of Eastern European universities.
2. No one knows the forecast of how quickly AI technologies will be introduced into higher education.
3. Female respondents quantitatively dominated among respondents.
4. The age of respondents was limited to 29 years.

Future research should:

- perform a comparative analysis and build a new classification of literature in the field of using AI technologies in higher education,
- create new AI technologies and tools to improve the quality of higher education,
- study groups of respondents with statistically equal numbers of males and female,
- include more diverse groups of respondents by age,
- take into account contexts of students' and higher education teachers' attitudes towards AI technologies,
- pay much more attention to the direct validation of teachers' competence in AI technologies,
- include such areas as law, ethics, and others in the scope of research,
- find solutions regarding further use of information and digital technologies by university teachers in the field of higher education.

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Contribution of Individual Authors to the Creation of a Scientific Article (Ghostwriting Policy)

- Valentyna Nechyporenko: performed conceptualization, writing - review, and editing.
- Nataliia Hordiienko: prepared the research methodology, and made formal and statistical analysis.
- Olena Pozdniakova: collected and analyzed the data of Professional College students, performed the primary data processing.
- Ellina Pozdniakova-Kyrbiatieva: collected and analyzed the data of Faculty of Art and Design students, writing - original draft preparation.
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All authors had approved the final version.

Sources of Funding for Research Presented in a Scientific Article or Scientific Article Itself
There were no sources of financing for the research.

Conflict of Interest
The authors declare no conflict of interest.