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CHATGPT: ATTITUDES AND EXPERIENCES OF TECHNICAL UNIVERSITY STUDENTS IN UKRAINE

Abstract. Given the rising prevalence of AI tools within educational contexts, it is crucial to understand the dynamics of interacting with these technologies, their benefits and drawbacks. This study explores the attitudes and experiences of students at a technical university in Ukraine who utilize ChatGPT. Employing a mixed-method research design, a comprehensive array of quantitative and qualitative data was collected through Google Form surveys from a cohort of 208 student volunteers, ensuring anonymity and voluntary participation. Analysis of the data revealed that the majority of students employed ChatGPT sporadically, primarily seeking assistance with programming tasks and grappling with complex concepts. While students expressed moderate satisfaction with ChatGPT's support and its perceived enhancement of their grasp of course material, they also acknowledged its positive impact on their academic performance both in technical sciences and humanities. Despite its user-friendly interface, students identified several challenges and limitations, including ChatGPT's inability to address technical issues and its occasional dissemination of inaccurate or outdated information, necessitating verification. Nevertheless, students displayed a clear inclination toward recommending ChatGPT for academic use to their peers. Their recommendations underscored the importance of cultivating responsible and effective utilization of ChatGPT, refining the construction of prompts, devising strategies to navigate its limitations, and leveraging its educational potential. Statistical analysis, specifically the calculation of median (Mdn) and Inter-Quartile Range (IQR), revealed a consensus regarding ChatGPT's positive impact on academic performance and its suitability for peer recommendation. This research makes a substantial contribution to the current discussion on incorporating AI into education as educators gain insights that can shape a more informed approach to its integration into teaching. The study highlights the importance of developing strong policy frameworks to guide the ethical and responsible application of AI tools. Further investigations of university instructors' perceptions and encounters with ChatGPT may be contrasted with those presented in this study. Such a comparative analysis will enable educators to leverage ChatGPT in teaching while upholding academic integrity.

Keywords: artificial intelligence (AI); technical university students; ChatGPT; asynchronous; academic integrity.

1. INTRODUCTION

The problem statement. Technological advancements undoubtedly shape the lives of people all over the world while artificial intelligence (AI) has been emerging as a forceful incentive. The scale of this transformation is impossible to predict, it might "have profound implications for how we understand human intelligence and learning" [1, p.10]. Technological progress has led to high expectations for AI's impact on education (AIED), however, they often stem from misunderstandings of current technology and limited awareness of AI's capabilities

in education [2, p.542]. Some educators write about a new kind of epidemic that jeopardizes human minds over their bodies, as ChatGPT, an AI chatbot, gains widespread traction [3, 2023]. There is an urgent need to gauge students' AI literacy to ensure the responsible use of ChatGPT as there are concerns about risks with GenAI technologies [4, p.14]. Because the integration of AI tools has become increasingly prevalent in educational settings, it is important to be aware of ways of interacting with these technologies, consider their benefits and drawbacks.

Online learning in Higher Education Institutions (HEIs) all over the world was accelerated by the Covid-19 pandemic, when the advantages and disadvantages of distance learning became apparent [5]. The issue of extensive ChatGPT usage became vital for Ukrainian HEIs when returning to the traditional brick-and-mortar model was impossible after the beginning of a full-scale war on the 24th of February, 2022. Despite the negative impact on people's lives, which led to drastic changes in the ways they live, study and work, the armed conflict could not disrupt the educational process in Ukraine [6, p.32].

Therefore, integration of ChatGPT in higher institutions and preserving the quality of education are issues of paramount importance. However, little attention was paid to the usage of ChatGPT at technical universities. This study aims to fill this gap, exploring the experiences of technical university students and their attitudes toward ChatGPT in the Ukrainian context.

Analysis of recent studies and publications. ChatGPT is defined as an AI agent "to perform high-level cognitive tasks and produce text that is indistinguishable from human-generated text" [7, p.17]. It is also called "a state-of-the-art language model" and "the world's most advanced chatbot" [8, p.342]. It was introduced with the main purpose of generating "human-like text in a conversational style" and perform the whole "range of language tasks" [9, p.1]. Developed by OpenAI, ChatGPT offers "personalized feedback, increased accessibility, interactive conversations, lesson preparation, evaluation, and new ways to teach complex systems" [10]. As one-to-one private lessons are usually expensive, ChatGPT may be a free tutor using prompts to guide students on the way to discovery [11, p.475]. ChatGPT can help researchers and educators by sparking original thought, offering context, and aiding critical analysis, requiring careful and purposeful application [12]. The general opinion is that there are three main applications of ChatGPT: "language translation, content generation, and language modelling" [9, p.2].

The possibility to provide asynchronous communication is one of the main advantages of ChatGPT, as it sustains students' interest and scaffolds autonomous learning in situations when a synchronous mode is not possible [9, p.2]. Air raids, power outages, stress and isolation make it practically impossible to conduct synchronous online lessons during wartime. Asynchronous communication using ChatGPT is also helpful in situations when students do not attend classes because of health conditions [5]. Another advantage of using ChatGPT is pursuing individual approach by improving assessment which is an inseparable part of higher education aimed at monitoring students' progress. Quizzes or tests can be customized according to students' skills, abilities, interests, and learning goals [5], [13]. The primary benefits of employing ChatGPT include generating valuable content, facilitating production, and offering feedback to foster language fluency enhancement [14, p.3]. Assessing tasks and offering valuable feedback promptly and with greater precision enhances the learning journey of students and allows educators to engage in more demanding responsibilities.

However, educators, stakeholders, and researchers have to adopt strategies for dealing with the risk of compromising academic integrity [5], [15]. According to the results of recent research, technologies like ChatGPT present a potential threat to the academic integrity of online assignments and exams [8, p.17]. It was discovered that cheating is more common in an online environment than in traditional, making mitigation, detection, and prevention of dishonest behavior an urgent issue to explore [16]. The main concern is about following academic ethical guidelines which could be compromised by misusing ChatGPT [17, p.120].

Even those students who do not usually cheat, are tempted to do so because of Internet availability, a possibility to generate a highly realistic text mimicking individual student's characteristics thus investing less effort with the same or even better results [15]. Moreover, those students who use ChatGPT to generate plausible answers may have unjustified advantages over others thus causing inequities and creating flaws in evaluation [9, p.3]. In addition, constant exploitation of ChatGPT may have far-reaching consequences like students' passive attitude and their inability to assess the final product [10]. Having a distorted understanding of what their students can do, educators may overlook some problems to be addressed. Eventually, academic dishonesty may lead to the devaluation of degrees, certificates, and diplomas, undermining the very core of education [9, p.3]. Using invigilated and oral exams in controlled environments could be an effective solution, still, further research is necessary to understand how large language models work and develop strategies to address the threats related to cheating using smart tools like ChatGPT [7, p.17]. ChatGPT can be used to detect plagiarism and improve original writing, but leading anti-plagiarism software companies are improving their products for educators [8, p.354]. Remarkably, while technology is exploited by students for cheating, it is also used by educators for detecting and mitigating their students' dishonest behavior [15].

Researchers write about the dangers of dehumanizing education, and AI usage turning learners into parrots or robots deprived of feelings and emotions [18]. There are even concerns regarding the existence of the teacher's profession as such. Avoiding teacher replacement with AI is vital to prevent increased adaptive AI use in education, resulting in less peer interaction, more machine decisions, and a focus on easily automatable knowledge.

While some educators and researchers consider ChatGPT to be a disruption and another challenge, it opens more opportunities for exciting discoveries that will advance education innovation [9, p.354]. There is no use in denying the role of ChatGPT in facilitating learning and communication in an academic environment. Although the implementation of ChatGPT has a positive impact, its application requires thorough preparation and caution [19]. Examining the perceptions and responses of technical university students makes it possible to reveal the nature of the evolving relationship between technology and education. By understanding students' perspectives and practices, educators can adopt a more informed approach to the implementation of AI technologies, ChatGPT in particular, enhancing the quality of education in technical universities.

The research goal. The article aims to explore technical university students' attitudes and experiences concerning the use of ChatGPT to reveal the implications for pedagogical practices and student engagement. To achieve the aim, the following research questions should be answered:

1. What are the demographic aspects of technical university students?
2. What is technical university students' ChatGPT usage regarding frequency and purpose?
3. What is ChatGPT's impact on technical university students' learning?
4. What is technical university students' experience of using ChatGPT?
5. Which recommendations on using ChatGPT do technical university students provide?

2. RESEARCH METHODS

A mixed-method research design to collect quantitative and qualitative data through Google Form surveys was exploited in this research. The respondents are students of the National Technical University of Ukraine "Igor Sikorsky Kyiv Polytechnic Institute", who answered twenty questions grouped under the categories such as demographic aspects (questions 1.1 – 1.3), ChatGPT usage (questions 2.1 – 2.3), impact on learning (questions 3.1 –

3.2), user experience (questions 4.1 –4.2), future recommendations (questions 5.1 – 5.2). Some questions required one possible answer, like the year of study, some were open for additional comments. The median (Mdn) and Inter-Quartile Range (IQR) using a five-point Likert scale were calculated in cases when it was applicable. Participation of technical university students (N=208) was voluntary and anonymous. The survey was completed in November 2023 – January 2024.

3. THE RESULTS AND DISCUSSION

The collected data on technical university students' attitudes and experiences using ChatGPT required analysing demographic information, students' usage of ChatGPT, its impact on students' learning, students' experience, and their recommendations on using ChatGPT.

3.1. Demographic information

Considering the program of study, about two-thirds of respondents were students who specialized in cyber security, others had such specialties as applied mathematics (22%), applied physics (10%), few focused on computer science (2%) and other subjects (2%) (See Figure 1).

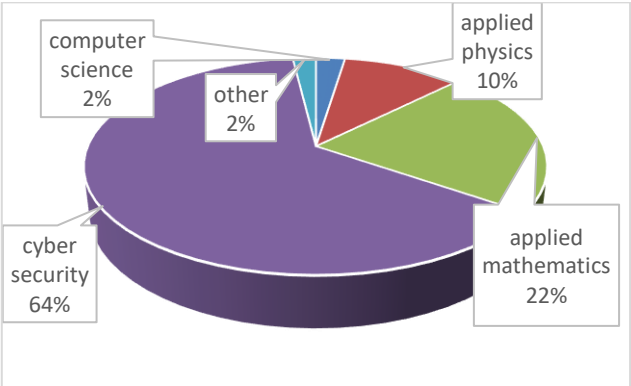

Figure 1. Program of study

Regarding the year of study, forty-one percent of the responses were provided by fourth-year bachelor students, the shares of first-year (20%) and third-year bachelor students (17%) were practically the same, and for second-year bachelor students and masters, it was 22% (See Figure 2).

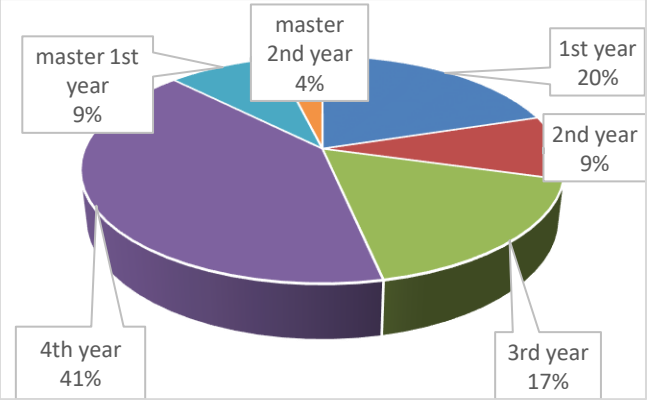

Figure 2. The year of study

Considering the gender of respondents, males prevailed (64%), females constituted 29 percent, and others preferred not to say. To sum up, most respondents were fourth-year bachelor male students who specialized in cyber security.

3.2. Students' usage of ChatGPT

According to the results of the study, less than half of respondents used ChatGPT occasionally (See Figure 3).

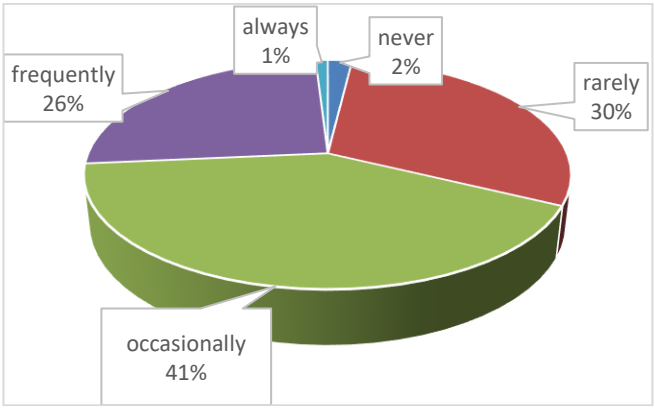

Figure 3. Frequency of ChatGPT usage

As shown in Table 1, the central tendency was that the students used ChatGPT occasionally, they were not decisive as there was a dispersion of the responses (Mdn=3, IQR=2).

Table 1

Students' frequency of ChatGPT usage

Section 2 ChatGPT usage	**Never**	**Rarely**	**Occasionally**	**Frequently**	**Always**	**Mdn**	**IQR**
2.1 How frequently do you use ChatGPT for academic purposes?	4 2%	6 30%	86 41%	53 26%	2 1%	3	2

Other research on the usage of ChatGPT in English for engineering classes showed similar results – half of the technical university students used it "from time to time". However, the percentage of those who never used ChatGPT was considerably higher – 35% [20, p. 135].

Responding to the question about areas of studies, students found ChatGPT most useful for programming assistance and understanding complex concepts, while writing assignments and exam preparation constituted about a third of the choices (See Figure 4).

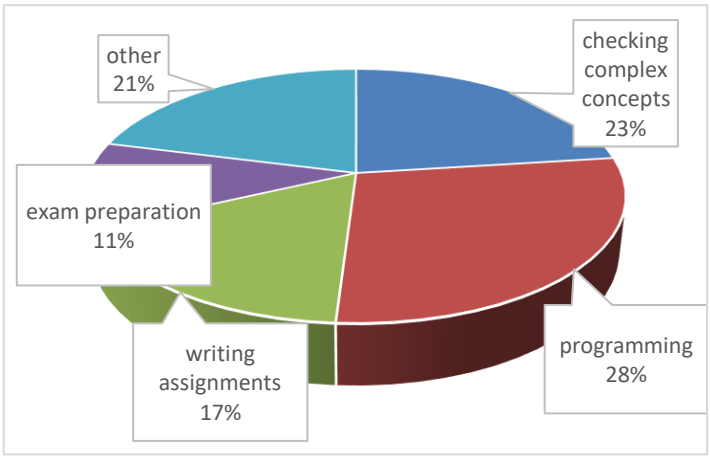

Figure 4. Areas of ChatGPT usage

The previous study found ChatGPT effective in ESL writing classes but raised concerns about academic integrity and fairness, calling for a reevaluation of policies on dishonesty [21]. Other researchers claim ChatGPT to be a writing assistant first of all, offering a wide range of phrases to use in various contexts and genres [22, p.104]. Students in our survey also added other incentives for using ChatGPT: "quickly find the information I need on the topic", "generating texts for humanitarian subjects and topics like "how a teacher should communicate with students during the lecture", "getting a short review of some topic", "finding inspiration", "systematizing data from many sources". There are some similarities between the feedback of students and the usages of ChatGPT indicated in other studies: "translation, summarization, question answering, and text generation" [9, p.1], "producing creative outputs to break writer's block" [23, p.7], dealing with "tedious and time-consuming tasks" [22, p.2078], checking the meaning of new words, writing essays, reports, summaries, etc. [20, p. 135]. As we can see, respondents in our study did not use ChatGPT for translation.

According to the results of our research, nearly half of the respondents were neither positive nor negative expressing their satisfaction with ChatGPT assistance in their academic work (See Figure 5).

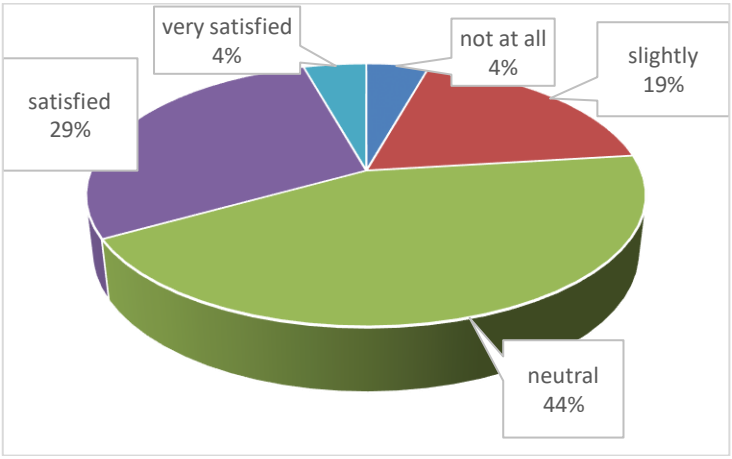

Figure 5. Satisfaction with ChatGPT assistance

While being cautious in expressing their satisfaction or dissatisfaction with ChatGPT assistance in their academic work (refer to Table 2), the respondents were decisive (Mdn=3, IQR=1).

Table 2

Students' satisfaction ChatGPT

Section 2 ChatGPT usage	Not satisfied	Slightly satisfied	Neutral	Satisfied	Very satisfied	Mdn	IQR
2.3 How satisfied are you with the assistance of ChatGPT in your academic work?	9 4%	39 19%	91 44%	60 29%	9 4%	3	1

In contrast to the results of our research, 67% of technical university students admitted that ChatGPT was rather useful in learning ESP, and 12% – that it was extremely useful [20, p. 135].

3.3. ChatGPT impact on students' learning

As shown in Figure 6, most of the respondents assessed impact on their understanding of course materials regarding technical sciences and humanities due to ChatGPT assistance as improved either moderately (43%) or slightly (35%).

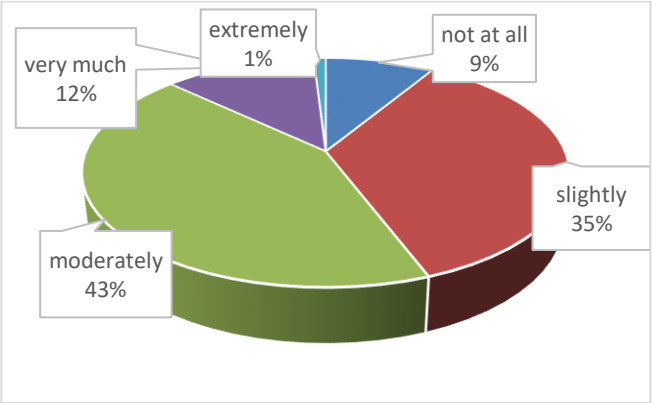

Figure 6. ChatGPT impact on course material understanding

All in all, as shown in Table 3, the central tendency of the responses was to choose "moderately", and the responses were not scattered (Mdn=3, IQR=1).

Table 3

Students' understanding of course material

Section 3 Impact on Learning	Not at all	Slightly	Moderately	Very much	Extremely	Mdn	IQR
3.1 To what extent has ChatGPT improved your understanding of course material?	18 9%	74 35%	89 43%	25 12%	2 1%	3	1

At the same time, about half of the respondents claimed that ChatGPT positively influenced their academic performance, more than a third being indecisive (See Figure 7).

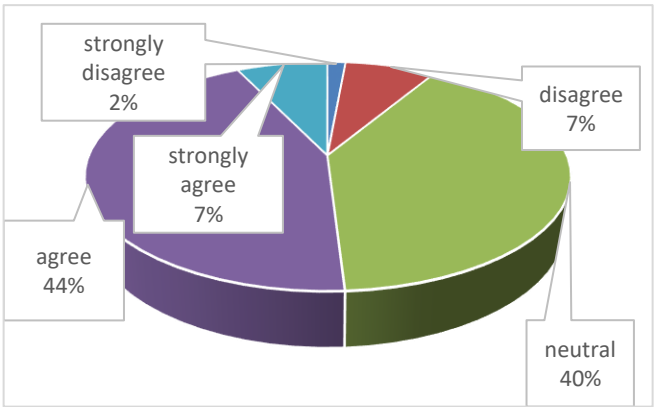

Figure 7. ChatGPT impact on academic performance

As shown in Table 4, ChatGPT had a positive impact on students' academic performance regarding their understanding as the central tendency was to choose "agree" and the responses were not scattered (Mdn=4, IQR=1).

Table 4

ChatGPT impact on students' academic performance

Section 3 Impact on Learning	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Mdn	IQR
3.2 Do you think using ChatGPT has positively influenced your academic performance?	3 2%	15 7%	84 40%	91 44%	15 7%	4	1

This result reveals commonalities with previous findings which state that ChatGPT shows incredible potential to boost learning efficiency and provide individualized scaffolding to learners [24]. The very facilitation of access to information improves students' academic performance [13].

3.4. Students' experience in using ChatGPT.

Reflecting on their experience, the majority of students (87%) confessed that they did not have any difficulties with using ChatGPT regarding their academic needs (See Figure 8).

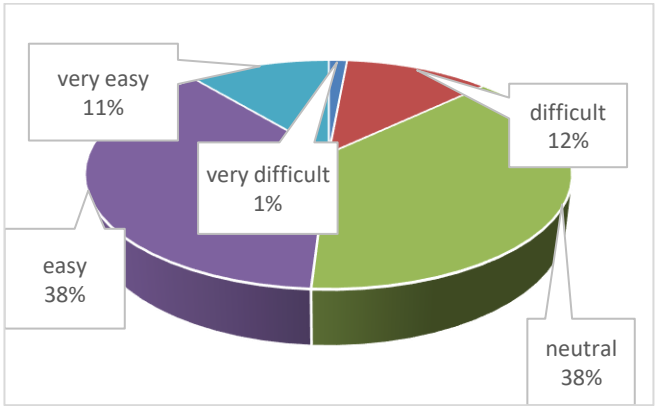

Figure 8. How user-friendly ChatGPT is for students

As shown in Table 5, the central tendency was that using ChatGPT was neither easy nor difficult, and the respondents were decisive (Mdn=3, IQR=1).

Table 5

Students' feedback as ChatGPT users

Section 4 User experience	**Very difficult**	**Difficult**	**Neutral**	**Easy**	**Very easy**	**Mdn**	**IQR**
4.1 How user-friendly do you find ChatGPT for your academic needs?	3 1%	24 12%	79 38%	79 38%	23 11%	3	1

Our findings align with other studies which state that students are mostly digital natives who use technology without effort [8, p.355].

Responding to the question about challenges or limitations while using ChatGPT, twenty percent of respondents indicated positive experience of using it, just a few did not use it at all. Others complained that ChatGPT "doesn't help with physics at all", cannot complete "a technical task", communicate on "grey/black hat", solve "a problem with malicious code", does not understand "discrete math", does not "want to give windows key for free". It should be noted that about 90% of the respondents mostly used the ChatGPT 3.5 free version. However, even those who exploited ChatGPT 4, were skeptical about its efficiency. Meanwhile, the researchers have different opinions on this issue. Some claim that ChatGPT can solve technical, for example, engineering and computer programming problems [10, p.15]. Others found out that ChatGPT made a lot of mistakes in completing tasks in physics, chemistry, computer science and mathematics [11, p.475].

Students also wrote about such limitations as "gross mistakes or misunderstanding of the question", providing "general phrases" which are not needed, it "may not respond correctly" even after reformulating the same question several times, "does not provide a link to the source of information", "writing proper requests is a big challenge". Wrong answers, as respondents claim "in 99% …. answers are wrong", "it may generate fictional information", and "a reference to imaginary things", could be explained by the fact that ChatGPT is based on outdated information and "does not have all the relevant information at the moment". There are also some comments about "knowledge limitations, image usage restrictions", and "pictures are not readable" because students "need to buy a subscription". Some students highlighted the issue of "academic integrity violation using ChatGPT". Our results align with a previous study that mentioned the drawbacks such as "a lack of common sense, potential bias, difficulty with complex reasoning, and inability to process visual information" [10, p.15].

However, some respondents confessed that this limitation of ChatGPT was beneficial for them because they were able "to learn more about the topic" while researching and double-checking. Other complaints were related to "problems with the Ukrainian language", the fact that "the free version does not allow to work with the Internet directly", and it was not possible to use files. Eventually, there may be so many limitations that "it's better to do that yourself in order not to waste time". Similarly, as it was previously acknowledged, access to large language models is still limited or expensive [22, p.2078]. There are growing concerns that ChatGPT may "exacerbate existing inequalities" in an educational environment and it will be a step further to the digital divide [11, p.477].

3.5. Students' recommendations on using ChatGPT

Considering the probability of recommending ChatGPT to their peers for academic use, 81 % of the respondents were positive (See Figure 9).

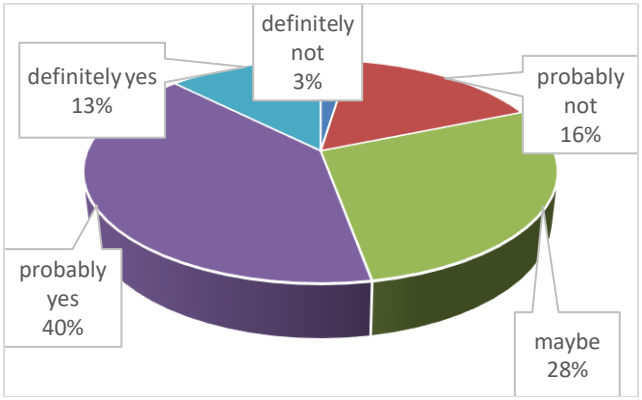

Figure 9. Would students recommend ChatGPT

Choosing "probably yes" was the central tendency (refer to Table 6), and the responses were not scattered (Mdn=4, IQR=1).

Table 6

Students' recommendations of ChatGPT usage

Section 5 Future recommendations	Definitely not	Probably not	Maybe	Probably yes	Definitely yes	Mdn	IQR
5.1 Would you recommend Chat GPT to your peers for academic use?	5 3%	34 15%	59 28%	84 40%	26 13%	4	1

Writing about additional features for improving ChatGPT, respondents suggested introducing free "interaction with the Internet", and "Premium versions", claiming that the main "problem is precisely the price". Students suggested improvements like providing "up-to-date information", "teaching ChatGPT using technical books", "physics", "programming", "more math symbols" or "updated biology knowledge base" in particular. According to respondents, it would be reasonable to increase its "speed and accuracy in answers", "improve the ability to solve complex tasks", "more access to educational databases", "the ability to connect to open source databases of my university", "make some templates for most popular tasks", "real-time collaborative note-taking capabilities", "personalized study recommendations", "to remove a mandatory field for a phone during registration", "better visualization, adding quizzes and tests, group work", "using Wolfram Alpha's information and working with photos for free", "opportunity to analyze photos", even "reading thoughts". A few students acknowledge the fact that users also "have to learn how to teach AI as well as to learn how to ask accurate questions", and "ChatGPT isn't a scary monster, it's a tool and students need to learn more about it before using it". Indeed, the quality of ChatGPT responses depends on requests, therefore, rephrasing is one of the skills students should develop. Some students did not have any suggestions such as "It does a great job anyway", "It works now", "I use ChatGPT 4, and that gives me a very good experience". It is apparent that some similarities exist in recommendations developed by experts: students should master AI tools, use ChatGPT to brainstorm, develop writing skills, solve real-life problems, read intensively, critically evaluate ChatGPT responses, and, eventually, take responsibility for their learning [8, p.356], [3, p.9].

In this research we used a five-point Likert scale calculating the median (Mdn) to find the central tendency for what most respondents believe or do and the Inter-Quartile Range (IQR) to show the dispersion of the responses. We calculated the median (Mdn) and Inter-Quartile Range (IQR) in cases when it was applicable, as some questions required either one answer or comments. To conclude, most respondents opted for neutral choices (questions 2.1, 2.3, 3.1, 4.1), and expressed agreement with two questions 3.2 and 5.1 (Mdn=4). Considering IQR we can see that all the responses except question 2.1 are clustered together (OIR=1), which means that respondents agreed with each other (Tables 1 – 6).

4. CONCLUSIONS AND PROSPECTS FOR FURTHER RESEARCH

This study is devoted to exploring technical university students' attitudes and experiences using ChatGPT. According to the results of the research, most students used ChatGPT occasionally, mainly for programming assistance and understanding complex concepts. Even though respondents assessed their satisfaction with ChatGPT assistance and improvement of their understanding of course material as moderate, they agreed that ChatGPT positively influenced their academic performance. Technically, using ChatGPT was not difficult for respondents. However, technical university students listed challenges and limitations of ChatGPT related to its inability to solve technical problems, and erroneous, biased, faulty or outdated information which had to be checked. At the same time, students advised ChatGPT for academic use to their peers. Students' recommendations on using ChatGPT reveal their understanding of the necessity to learn more about responsible and effective use of ChatGPT, writing effective prompts, mastering strategies to mitigate its limitations, and exploiting its educational potential. In this research, we calculated the median (Mdn) and Inter-Quartile Range (IQR) in cases when it was applicable. Given this, most respondents expressed agreement with two questions – about the positive influence of Chat GPT on their academic performance both in technical sciences and humanities and recommending it to their peers. Practically all the responses, except the question about frequency of ChatGPT usage, are clustered together which means that respondents agreed with each other.

This study highlights the importance of offering training and assistance to educators in effectively integrating AI tools at technical universities. Such support is crucial for educators to better align with students' expectations. This study contributes significantly to the ongoing discourse surrounding the integration of AI in education. Understanding technical university students' perspectives and practices of using ChatGPT allows educators to adopt a more informed approach to using ChatGPT in teaching. Additionally, this research underscores the significance of establishing robust policy frameworks to ensure the responsible and ethical use of AI tools. Regarding the prospects for further research, we consider it important to explore university teachers' attitudes and experiences using ChatGPT and then compare the results with those obtained in this study. Such a comparative study will allow educators to use ChatGPT in teaching without violating academic integrity.

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CHATGPT: СТАВЛЕННЯ ТА ДОСВІД СТУДЕНТІВ ТЕХНІЧНОГО УНІВЕРСИТЕТУ В УКРАЇНІ

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Анотація. Враховуючи дедалі більшу поширеність інструментів штучного інтелекту в освітньому контексті, надзвичайно важливо розуміти динаміку взаємодії з цими технологіями, їх переваги та недоліки. Запропоноване дослідження вивчає сприйняття і використання ChatGPT студентами технічного університету в Україні. Ми використовували змішаний метод дослідження, зібравши повний масив кількісних і якісних даних за допомогою опитувань Google Form когорти з 208 студентів, забезпечуючи їх анонімність і добровільну участь. Аналіз даних показав, що більшість студентів використовували ChatGPT епізодично, переважно шукаючи допомоги з програмування і розуміння складних концепцій. Студенти висловили помірне задоволення підтримкою ChatGPT та його впливом на поліпшення їх розуміння навчального матеріалу, проте визнали його позитивний вплив на їх академічну успішність з технічних та гуманітарних наук. Попри зручний інтерфейс, студенти виявили кілька проблем і обмежень, зокрема нездатність ChatGPT розв'язувати технічні завдання та поширення неточної або застарілої інформації, що потребує перевірки. Однак переважна більшість студентів рекомендувала ChatGPT для академічного використання своїм одноліткам. У своїх рекомендаціях вони підкреслюють важливість виховання відповідального ставлення та навчання ефективному використанню ChatGPT, удосконалення формулювання інструкцій, розробку стратегій для подолання його обмежень і використання освітнього потенціалу. Статистичний аналіз, зокрема розрахунок медіани (Mdn) і міжквартильного діапазону (IQR), виявив одностайність думок щодо позитивного впливу ChatGPT на академічну успішність з технічних та гуманітарних наук та його подальшого використання. Наше дослідження робить внесок у поточну дискусію щодо впровадження ШІ в освіту, оскільки викладачі отримують знання, які можуть сприяти формуванню більш обґрунтованого підходу до інтеграції ChatGPT у навчання. Дослідження підкреслює важливість розробки рекомендацій щодо етичного і відповідального застосування інструментів ШІ. Доцільно провести подальші порівняльні дослідження сприйняття і використання ChatGPT викладачами університетів. Такий порівняльний аналіз дозволить викладачам інтегрувати ChatGPT у навчання, дотримуючись принципів академічної доброчесності.

Ключові слова: штучний інтелект (ШІ); студенти технічних університетів; ChatGPT; асинхронність; академічна доброчесність.