

Analysis of the Utilization of AI Chat GPT in the Academic Life of Prospective Mathematics Teacher Students

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Abstract

This study aims to analyze the utilization of ChatGPT by prospective mathematics teacher students and to examine the potential risks of using ChatGPT in coursework. A case study method with a qualitative approach is employed in this research. Data is collected through a survey, which is distributed online via Google Forms to prospective mathematics teacher students. The results indicate that ChatGPT significantly enhances learning efficiency and aids in completing assignments. However, there are concerns about potential misuse and its negative impact on critical thinking skills and academic ethics. These findings highlight the need for wise usage guidelines and education regarding the ethical use of AI technology in education.

Keywords: ChatGPT, Prospective Mathematics Teacher, Technology Utilization

Introduction

We are in an era where technology and the internet are developing rapidly, making everything more efficient and practical (Selin, 2022). This technological advancement has significantly impacted daily life, including the field of education. These advancements have brought significant changes to the world of education (Dewi et al., 2023). With technological advancements, learning materials have become more diverse and no longer centralized on educators but also oriented toward learning resources that utilize tools to accelerate access to various general learning sources (Hsb, 2024). In this context, technology becomes an essential knowledge area for educators, students, and even college students to prepare them for 21st-century learning (Faiz & Kurniawaty, 2023).

One AI technology often used in education is Chat GPT. Chat GPT (Generative Pre-Trained Transformer) is a type of artificial intelligence used for text-based conversational interactions. According to (Lund & Wang, 2023), Chat GPT has great potential to promote academia and manage libraries in new ways. In short, Chat GPT works by gathering information from articles, journals, and newspapers on the internet. It then absorbs all this information, enabling it to quickly provide answers when someone searches for any information (Suharmawan, 2023). This aligns with the opinion of ‘(’Amala et al., 2023),

who stated that using Chat GPT can also facilitate activities for students and lecturers in completing assignments.

In the context of mathematics education, ChatGPT has demonstrated significant potential to enhance self-regulated learning by offering step-by-step explanations, personalized problem-solving feedback, and interactive dialogue. A scoping survey in Digital Experiences in Mathematics Education found that ChatGPT provides individualized and interactive educational learning, as well as precise explanations and step-by-step instruction, supporting motivation, performance, and reflection phases in students' self-regulation processes (Pepin et al., 2025). Moreover, other research observed that mathematics teachers perceive ChatGPT as an effective tool for delivering real-time, tailored feedback that promotes student understanding (Khalloufi-Mouha, 2024; Taani & Alabidi, 2024).

The presence of Chat GPT has sparked debates in the education sector. On the one hand, Chat GPT offers high accessibility and availability, allowing students to get help anytime and anywhere and offering personalized learning support tailored to individual needs (Al-Zahrani & Alasmari, 2024). This technology also improves efficiency by quickly providing answers, encouraging independent learning, and offering opportunities for repetition and practice of materials (Holmes et al., 2019). However, on the other hand, concerns arise regarding students' dependency on AI, the accuracy of the answers provided, and the limitations of AI's contextual understanding (Dergaa et al., 2023). Additionally, ethical risks and plagiarism issues emerge, along with the potential reduction of human interaction, which is crucial for students' social and emotional development (Chen et al., 2023; Peres et al., 2023).

The urgency of understanding ChatGPT's role in education is underscored by its increasing adoption in academic settings globally. According to the UNESCO AI and Education guidance policy-makers (UNESCO, 2021), Higher education institutions are exploring AI tools to enhance student support, develop digital competencies, and increase access to quality education. However, these developments are not without challenges. A survey by EDUCAUSE (Muscanell & Gay, 2025) found that the use of generative AI by students in their coursework appears to be fairly limited. When asked about their current engagement with generative AI in academic settings, the most frequent response, chosen by 43% of participants, was that they do not use such tools. Among those who do utilize AI, the most common applications include brainstorming and generating ideas (33%), refining

thoughts or questions (24%), and creating outlines or organizing content (24%). Interestingly, findings from that survey indicate a differing perspective from higher education professionals, the majority of whom believe students are using AI tools in a variety of ways. These include solving problems (69%), editing or refining writing (67%), summarizing material (61%), and brainstorming (55%). Notably, less than 1% of these professionals reported that students at their institutions do not use AI, contrasting sharply with the 43% of students who claimed non-use. However, this discrepancy may be partly explained by the EDUCAUSE study's inclusion of AI use beyond the classroom, such as for entertainment or personal tasks (Muscanell & Gay, 2025).

The learning process using technological resources like Chat GPT provides an opportunity for educators to act as facilitators, enabling collaborative learning rather than being the sole providers of information (Afriani et al., 2025). In addition to transferring knowledge, educators can collaborate with students to facilitate knowledge-sharing between students and teachers. Educators can use technology relevant to their subjects, ensuring that the characteristics of learning using technological media align with the essence of the knowledge being taught (Munir, 2017).

(Lund & Wang, 2023) explain that Chat GPT has great potential to advance scholars in new ways. However, it is essential to consider how professionals can use this technology responsibly and ethically to enhance their work rather than misuse it. Furthermore, research by (Rudolph et al., 2023) indicates that Chat GPT has emerged as a technology capable of radically transforming social interactions in new ways.

Despite its many advantages, Chat GPT still has some weaknesses. According to (Faiz & Kurniawaty, 2023), the drawbacks of Chat GPT are as follows: (1) Learning requires direct interaction/relationships that involve many emotional aspects between educators and students and an approach based on examples or models in the learning process to achieve academic success, which Chat GPT cannot provide. (2) Learning involves creativity to inspire new ideas and innovations provided to students for feedback that can be developed individually, but Chat GPT does not possess human-level creativity. (3) Chat GPT cannot recognize the nuances and learning styles unique to each individual. (4) Socially, dependency on Chat GPT may lead to reduced self-confidence as individuals lack understanding when interacting with their social environment. (5) Psychologically, excessive dependence on Chat GPT can diminish critical thinking skills, hindering individuals from addressing real-life problems they encounter.

Due to its numerous capabilities, Chat GPT has sparked many debates. The detailed and human-like quality of its generated writings makes it difficult to differentiate from human-written content (Elkins & Chun, 2020). This has increased Chat GPT's popularity among students, as it simplifies access to information. Therefore, students must use Chat GPT wisely and selectively when accepting information from its search results.

The emergence of Chat GPT technology among students has brought social changes in communication methods, information accessibility, learning approaches, collaborative learning, and students' learning styles. The use of AI Chat GPT in the academic context has drawn attention as an innovative learning tool. With its ability to respond to questions, provide explanations, and even facilitate discussions, AI Chat GPT can be a valuable partner for students in exploring learning materials. In this context, this research aims to investigate the utilization of AI Chat GPT in university students' academic life, focusing on users' perceptions and trust levels toward this technology. Based on the background above, this study seeks to address the following research questions: (1) How do prospective mathematics teacher students perceive the use of ChatGPT in their academic tasks? (2) What is their level of trust in the responses generated by ChatGPT? (3) In what ways do they utilize ChatGPT to support their academic activities, particularly in mathematics-related contexts?

Method

This research employs a case study method with a qualitative approach. (Kusumastuti & Khoiron, 2019) explains that a case study is a research strategy in which researchers thoroughly investigate a program, event, activity, process, or group of individuals. According to (Yin, 2018), the case study method aims to describe an event or phenomenon in a real-world context, so the case study research design was chosen because the focus of this study is to determine the use of AI ChatGPT in the world of mathematics teacher education.

The data collection technique used in this study was a survey, which was chosen because it allows researchers to collect data efficiently from many respondents in a short period of time. The survey was conducted among Mathematics Education students from the 2021 cohort at one of the universities in Yogyakarta to investigate their utilization, perceptions, level of trust, and experiences regarding the use of AI ChatGPT. Prior to use, the instrument was validated using the Pearson Product-Moment correlation method. The

results of the validation test indicated that the survey items were valid and suitable for data collection.

This survey was distributed online via Google Forms to students in the Mathematics Education Study Program class of 2021. The sampling technique used was purposive sampling, which is the selection of respondents based on the criteria that they are active students who have used AI ChatGPT in their lectures. A total of 40 students completed this survey. The research began with the development of a questionnaire based on relevant literature and the research objectives. The questionnaire was then distributed online via Google Forms to all students of the 2021 cohort. Data collection was conducted over a one-week period.

The collected data were analyzed qualitatively and quantitatively. Quantitative data from closed-ended questions were processed using descriptive statistics to determine the frequency distribution and percentages of respondents' answers. Qualitative data from open-ended questions were analyzed using thematic analysis to identify the main themes emerging from the respondents' answers. The results of this analysis were used to provide a comprehensive description of how AI ChatGPT is utilized by prospective mathematics teacher students. The list of survey questions used is presented as follows.

Table 1. List of questions

No	Topic	Statment	Answer Choices
1	Use of Chat GPT	How often do you use AI Chat GPT to help with your lecture assignments?	Very rarely
			Occasionally
			Frequently
			Very frequently
2		Under what conditions do you use gpt chat	Helping with the learning process
			Doing assignments
			Searching for information
			Asking for suggestions or ideas
3	Effectiveness and satisfaction	How effective do you think AI Chat GPT is in providing assistance in completing your lecture assignments?	Very ineffective
			Ineffective
			Somewhat effective
			Effective
4		What is your level of satisfaction with the use of AI Chat GPT in helping you with your lecture assignments?	Very effective
			Very dissatisfied
			Dissatisfied
			Somewhat satisfied
5	Easiness	How easy is it for you to find relevant and precise answers from GPT's AI Chat?	Satisfied
			Very satisfied
			Very dissatisfied
			Dissatisfied
6	Belief	To what extent do you feel confident in the answers provided by AI Chat GPT in the lecture context?	Somewhat satisfied
			Satisfied
			Very satisfied
			Very dissatisfied
6		To what extent do you feel confident in the answers provided by AI Chat GPT in the lecture context?	Very distrustful
			Distrustful
			Somewhat trustful
			Trustful
			Very trustful

Results and Discussion

The researcher distributed a questionnaire to students via Google Forms, and a total of 40 students completed the survey. The survey results are presented as follows.

Table 2. Survey Results

No	Statment	Answer Choices	Frequency	Percentage
1	How often do you use AI Chat GPT to help with your lecture assignments?	Very rarely	3	7,5%
		Occasionally	23	57,5%
		Frequently	12	30%
		Very frequently	2	5%
2	How effective do you think AI Chat GPT is in providing assistance in completing your lecture assignments?	Very rarely	2	5%
		Occasionally	4	10%
		Frequently	14	35%
		Very frequently	9	22,5%
3	To what extent do you feel confident in the answers provided by AI Chat GPT in the lecture context?	Very distrustful	1	2,5%
		Distrustful	3	7,5%
		Somewhat trustful	19	47,5%
		Trustful	12	30%
		Very trustful	5	12,5%
4	How easy is it for you to find relevant and precise answers from GPT's AI Chat?	Very dissatisfied	2	5%
		Dissatisfied	6	15%
		Somewhat satisfied	12	30%
		Satisfied	16	40%
		Very satisfied	4	10%
5	What is your level of satisfaction with the use of AI Chat GPT in helping you with your lecture assignments?	Very dissatisfied	1	2,5%
		Dissatisfied	3	7,5%
		Somewhat satisfied	22	55%
		Satisfied	12	30%
		Very satisfied	2	5%
6	Under what conditions do you use gpt chat	Helping with the learning process	11	27,5%
		Doing assignments	7	17,5%
		Searching for information	12	30%
		Asking for suggestions or ideas	10	25%

In a survey conducted with 40 student respondents, it was found that the use of AI ChatGPT to assist with academic tasks varied widely. A total of 57.5% of respondents reported using AI ChatGPT occasionally, 30% used it frequently, 5% used it very frequently, and 7.5% stated that they rarely used it. Although the majority of students only used AI

ChatGPT sporadically, the data shows that nearly half of the respondents frequently relied on ChatGPT for various purposes.

The effectiveness of AI ChatGPT in providing assistance for academic tasks was rated as quite effective by 35% of respondents. However, a smaller proportion of respondents considered it ineffective (10%) or very ineffective (5%). Overall, the majority of respondents viewed AI ChatGPT as a fairly effective tool for completing academic assignments, highlighting its usefulness among students.

In terms of trust, the majority of respondents (47.5%) expressed moderate trust in the answers provided by AI ChatGPT, while 30% trusted it and 12.5% expressed high trust. On the other hand, 7.5% of respondents indicated distrust, and 2.5% expressed very high distrust. Some respondents experienced difficulties in finding relevant and accurate answers through AI ChatGPT, with 15% stating that they encountered such challenges. However, the majority found it moderately easy or easy to find answers, with a percentage of 52.5%.

Regarding satisfaction levels, the majority of respondents (55%) stated that they were moderately satisfied with the use of AI ChatGPT in helping them with academic tasks. Meanwhile, 30% reported being satisfied, and 5% expressed high satisfaction. A small portion of respondents were dissatisfied (10%), and 2.5% were very dissatisfied. Data from the table also revealed that the largest percentage of ChatGPT utilization among students was for searching for information (30%), followed by assisting with the learning process (27.5%). The remaining respondents used it to request suggestions or ideas (25%) and to complete assignments (17.5%).

The use of AI ChatGPT among students varies in terms of usage frequency. Most students use ChatGPT with medium to frequent intensity, while a smaller number use it rarely. This high usage frequency suggests that ChatGPT has become a common tool in daily academic activities. This can be attributed to the easy access provided by ChatGPT and its ability to offer quick and timely assistance in completing assignments and academic work. This aligns with the study by (Romlah et al., 2023), which indicated that the utilization of ChatGPT in the learning process has positively impacted students by supporting and enriching their learning experiences. Research by (Park & Watnick, 2023) also found that young adults, particularly university students, are more inclined to use ChatGPT compared to older individuals, as they find it beneficial and helpful in completing tasks. Thus, the use of ChatGPT by students has become commonplace due to its accessibility and the benefits it offers.

The ease of access provided by ChatGPT enables students to use this technology more widely and frequently. Over the past few decades, technological advancements, particularly in artificial intelligence (AI), have significantly transformed educational practices (Grassini, 2023). The use of AI in education can make learning more engaging and enhance student success (Rajeswari & Purushothaman, 2023). Consequently, ChatGPT has become an integral part of daily academic activities, especially in completing assignments and synthesizing information. Additionally, ChatGPT's ability to provide quick and timely assistance enables students to manage their time more effectively and improve the quality of their academic work. Research conducted by (Setiawan & Luthfiyani, 2023) showed that ChatGPT can produce contextually relevant writing aligned with user intent within a relatively short time, approximately seven minutes. These findings demonstrate that ChatGPT can help students manage their time efficiently and enhance the quality of their academic work. The high frequency of ChatGPT usage among students can be seen as an indicator of the ease and efficiency offered by this technology.

Most respondents considered ChatGPT quite effective in assisting with academic tasks, indicating its ability to provide useful and relevant answers for students. ChatGPT's popularity among students has increased, particularly due to its capability to produce well-structured writing (Setiawan & Luthfiyani, 2023). Additionally, ChatGPT facilitates easy access to extensive and comprehensible information and materials (Kusumaningtyas et al., 2023). Another advantage that contributes to its popularity is its ability to answer questions effectively and solve problems quickly (Pontjowulan, 2023). By utilizing advanced AI technology, ChatGPT delivers consistent and accurate responses at any time, thereby enhancing the efficiency and accuracy of information. In an educational context, ChatGPT can provide personalized learning experiences, analyze student performance, and recommend learning materials tailored to their strengths and weaknesses. However, a small number of respondents perceived this tool as ineffective, which could be due to various factors, including the complexity of the tasks or the AI's limited understanding of specific contexts. Research by (Darman, 2024) found that ChatGPT has limitations in addressing complex issues, as it lacks the ability to understand broader contexts and often overlooks other relevant factors. They also found that ChatGPT can only provide general answers and is unable to present complete rules.

The use of ChatGPT by students in various academic situations, such as assisting in learning processes, completing assignments, searching for information, and seeking advice

or ideas, demonstrates its high flexibility and applicability across different contexts. This is particularly because ChatGPT represents an AI innovation that offers new and modern learning experiences for every student (Aljanabi et al., 2023). With its ability to generate text automatically and responsively, ChatGPT is expected to expedite and improve the quality of students' written outputs. This also allows students to utilize their time more effectively and increase efficiency in interacting with information sources. The use of ChatGPT in various academic situations also indicates its potential to help students develop creative and innovative skills.

However, the use of ChatGPT also requires attention to ethical considerations and the quality of information it generates. In some cases, the information provided by ChatGPT can be misleading, false, or irrelevant, making it important to monitor and evaluate the information before using it. Therefore, clear guidelines and regulations regarding ChatGPT usage are necessary, including rules about academic honesty and plagiarism, to ensure ethical and effective use in supporting students' academic endeavors.

Despite its many advantages, the utilization of ChatGPT in education also poses several potential risks. One such risk is the potential for plagiarism in writing (Peres et al., 2023). By using ChatGPT, students can easily find answers similar to others' work, reducing the need for original thought. This may affect the quality of writing and increase the likelihood of plagiarism. Sanctions for plagiarism in final assignments or academic works, which may include using ChatGPT, can lead to degree revocation and imprisonment of up to two years, along with a maximum fine of 200 million rupiahs, as stipulated in Article 25 paragraph 2 of the Education System Law and Article 70 of the same law.

Continuous use of ChatGPT may also reduce the essence of research. When students rely too heavily on this technology, they may not need to think critically or learn more effective ways to search for information. This can diminish their ability to think critically and make better decisions (Faiz & Kurniawaty, 2023). In some cases, using ChatGPT can lead to dependency on technology, leaving students unable to think independently (Kasneci et al., 2023). Considering both the benefits and potential risks associated with ChatGPT usage, students must be self-aware of the impacts of its use. Therefore, students should use ChatGPT wisely to uphold academic ethics and morals, ensuring that their actions bring benefits to themselves and others.

Conclusion and Suggestion

Based on the literature analysis and surveys conducted, it was found that ChatGPT offers various advantages, including quick access to information and support in completing assignments. This tool has proven to enhance the efficiency and effectiveness of student learning while also helping them develop 21st-century skills.

However, this study also identifies several key challenges. One of the main issues is the potential misuse of ChatGPT, which can diminish students' critical and analytical abilities and threaten academic integrity. Additionally, there is concern about over-reliance on this technology, which may hinder the development of essential foundational skills for students.

These findings suggest that while ChatGPT holds great potential to support education, its use must be balanced with strict ethical guidelines and heightened awareness among students. Educators also need to integrate this technology wisely to ensure that its benefits are maximized without compromising other crucial aspects of the educational process.

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