



The ChatGPT phenomenon: an exploration of physics education students' use of ChatGPT in completing physics assignment

Fitri Azkia^{1*} and Siti Bulkiah¹

¹Mulawarman University, Samarinda, Indonesia

*fitrizidanfauzan@gmail.com

© The Author(s) 2026

Article	Abstract
<p>Keywords: ChatGPT, Physics Assignments, Physics Education Students, Usage Ethics</p> <p>Article History Received: April 27, 2026 Accepted: May 21, 2026 Published: May 24, 2026</p>	<p>This study aims to describe the use of ChatGPT in completing physics assignments by students in the Physics Education programme at Mulawarman University. This study employed a descriptive quantitative method involving 60 students as participants. A Likert-scale questionnaire was developed to measure five aspects: level of understanding and usage, effectiveness, attitude towards usage, ethics of usage, and the significance of using ChatGPT. The data were analysed using descriptive statistics, including percentages, means, and standard deviations. The results indicate that students generally hold a positive perception of ChatGPT usage, particularly regarding its ability to enhance learning motivation, aid conceptual understanding, and solve physics problems. The 'attitude towards usage' dimension scored highest, whilst the 'ethics of usage' dimension scored lowest, highlighting the need to raise awareness of responsible technology use. The findings of this study suggest that ChatGPT has the potential to be an effective learning aid. Recommendations from this study include the importance of integrating ethical literacy into the use of AI technology, as well as the development of more adaptive and responsible AI-based physics learning strategies.</p>

INTRODUCTION

The advancement of artificial intelligence (AI) technology has brought significant changes in various fields, including education. One AI-based innovation widely used in the context of learning is ChatGPT, a natural language processing model based on the Generative Pre-trained Transformer (GPT) developed by OpenAI. ChatGPT is designed to generate quick and relevant text responses to help users understand concepts, solve problems, and support academic writing [1]. The integration of ChatGPT into the world of education has garnered attention due to its ability to provide flexible and easily accessible learning support [2]. Its use continues to grow as students gain greater access to digital technology and the need for efficient learning resources increases.

In physics education, which is known for its high level of complexity, particularly in understanding abstract concepts and solving mathematical problems, ChatGPT offers an interactive and instant learning alternative. Several studies indicate that AI-based chatbots are capable of answering questions, explaining concepts, and effectively assisting students in resolving academic challenges [3]. The use of ChatGPT is also associated with improved conceptual understanding, learning motivation, critical thinking skills, and students' science literacy [4,5]. Additionally, ChatGPT can help students complete assignments, understand course material, and support self-directed learning through adaptive and flexible interactions [6]. ChatGPT's conversational nature allows students to ask questions repeatedly without hesitation and receive quick feedback, thereby supporting a more personalized learning experience.

Previous research has shown that ChatGPT still has limitations in solving visual problems, such as interpreting graphs, diagrams, and complex symbolic representations commonly found in physics education [7]. Additionally, concerns have been raised regarding ethical issues, student reliance on AI, academic integrity, and the potential for inaccurate information [8]. Students lacking adequate critical

evaluation skills tend to accept AI-generated information without verification, potentially leading to misconceptions and superficial conceptual understanding [9].

For physics education students, the use of ChatGPT warrants special attention because they serve not only as technology users but also as future educators who will eventually integrate AI technology into the learning process. If the use of AI technology is not accompanied by adequate digital literacy and an understanding of ethics, it could impact the quality of learning and academic integrity in higher education. Excessive reliance on AI has the potential to diminish students' critical thinking abilities, problem-solving skills, and deep conceptual understanding [10]. Furthermore, a lack of understanding regarding the ethics of AI use can lead to plagiarism and the misuse of information in academic activities [11]. Therefore, it is important to determine the extent to which Physics Education students utilize ChatGPT in completing physics assignments, as well as how this affects their learning motivation, conceptual understanding, and academic independence.

A measurement instrument in the form of a questionnaire with a 5-point Likert scale was used to measure each of these aspects, each of which was developed from indicators sourced from previous studies [12]. Previous research indicates that ChatGPT can enhance conceptual understanding, facilitate problem-solving, and improve learning autonomy. However, empirical data regarding specific patterns of ChatGPT usage in the context of physics assignments by education students remains limited. Thus, this study aims to provide a comprehensive overview of the extent to which Physics Education students utilize ChatGPT in completing assignments, as well as to assess the potential and challenges arising from the integration of AI technology into the Physics learning process at the university level.

RESEARCH METHOD

This study employs a descriptive quantitative approach aimed at describing the patterns of ChatGPT utilization by students in completing physics assignments. The research subjects were 60 students from the Physics Education Program at Mulawarman University, selected using purposive sampling, that is, the deliberate selection of respondents based on the criterion that they had used ChatGPT in academic activities, specifically in completing physics assignments.

The research instrument was a questionnaire using a 5-point Likert scale, consisting of five main aspects: (1) level of understanding and use of ChatGPT, (2) effectiveness of use, (3) attitudes toward use, (4) ethics of use, and (5) significance of use in the learning process. The instrument was developed based on indicators adapted from previous research on AI-assisted learning and the use of ChatGPT in education [12]. The questionnaire consists of 25 items distributed proportionally across the five aspects, with each aspect represented by five items.

The first aspect, namely the level of understanding and use of ChatGPT, measures students' knowledge of and frequency of using ChatGPT to complete physics assignments. Examples of statements in this aspect include: "I understand how to use ChatGPT to help solve physics problems" and "I often use ChatGPT when working on physics assignments." The second aspect, effectiveness of use, aims to measure students' perceptions of ChatGPT's benefits in supporting learning activities. Examples of statements include: "ChatGPT helps me understand physics concepts more easily" and "ChatGPT helps me find solutions to physics problems quickly." The third aspect, attitude toward use, evaluates students' responses and acceptance of ChatGPT's integration into learning activities. Examples of statements in this aspect include: "I feel comfortable using ChatGPT as a learning tool" and "Using ChatGPT increases my motivation to study physics." The fourth aspect, ethics of use, focuses on students' awareness regarding the responsible and ethical use of AI technology in academic activities. Examples of statements include: "I use ChatGPT responsibly without violating academic integrity" and "Information generated by ChatGPT needs to be verified before being used in assignments." The fifth aspect, perceived utility, measures students' perceptions of the importance of ChatGPT and its contribution to their overall learning process. Examples of statements in this aspect include: "ChatGPT

plays an important role in helping me complete my physics assignments” and “Using ChatGPT supports independent learning.”

Data collection was conducted online in May 2025 via a Google Form distributed to respondents through the class WhatsApp group. Students were given one week to complete the questionnaire independently. The collected data were analyzed using descriptive statistics, namely percentages to determine the distribution of responses, the mean to identify general trends, standard deviation to assess variation, and kurtosis and variance to describe the distribution of respondents' data in greater detail. A 5-point Likert scale was used to measure respondents' level of agreement with each statement in the questionnaire. The scale classification is presented in Table 1.

Table 1. Likert Scale

Scale	Score	Scale Range
Strongly Agree (SA)	5	4.20 – 5.00
Agree (A)	4	3.40 – 4.19
Somewhat Agree (SA)	3	2.60 – 3.39
Disagree (D)	2	1.80 – 2.59
Strongly Disagree (SD)	1	1.00 – 1.79

Based on Table 1, a higher score indicates a more positive level of agreement among respondents regarding the use of ChatGPT in the physics learning process. Conversely, the lower the score obtained, the greater the rejection or negative perception of ChatGPT's use. Scale range classification was used to facilitate the interpretation of data analysis results, thereby revealing trends in attitudes, understanding, effectiveness, ethical use, and the perceived significance of ChatGPT based on respondents' answers.

RESULTS AND DISCUSSION

This study aims to describe the patterns of ChatGPT usage in completing physics assignments by Physics Education students. Based on the results of data analysis of five aspects measured through a Likert scale questionnaire, a general picture emerged that the majority of students demonstrated a positive attitude toward the use of ChatGPT. Data from 60 respondents were analyzed using descriptive statistics, including mean, standard deviation, variance, and kurtosis. These statistical measures were used to identify the general tendency, distribution, and variability of students' responses regarding the use of ChatGPT in completing physics assignments. The findings provide an overview of the patterns and intensity of ChatGPT use among students, as well as their perceptions of its effectiveness and impact on the learning process. Previous studies have shown that AI-based learning tools such as ChatGPT can support conceptual understanding, improve learning motivation, and facilitate independent learning through interactive and adaptive responses [4,5]. In addition, the use of descriptive statistical analysis enables researchers to interpret students' attitudes and experiences toward technology integration in education more comprehensively [9,10]. Therefore, the analysis results in this study are expected to provide deeper insights into the opportunities and challenges of implementing AI technology in physics learning at the university level. Furthermore, the results of the descriptive analysis for each aspect are presented in the Table 2.

Based on the data obtained in this study, the results of the descriptive analysis of the five dimensions of ChatGPT utilization indicate that, in general, physics education students have a positive response to the use of ChatGPT in completing physics assignments. The attitude aspect toward the use of ChatGPT (TOTALX.3) showed the highest mean value of 18.00, with a standard deviation of 2.449. This indicates that students view the use of ChatGPT as beneficial, practical, and supportive of the task-completion process. This finding aligns with the study, which states that the use of AI in education can enhance motivation and foster positive attitudes toward learning. The aspects of the perceived meaning of ChatGPT use (TOTALX.5) and its effectiveness in supporting physics assignments (TOTALX.2)

also showed high mean scores, at 17.50 and 17.08, respectively. Students recognized that ChatGPT can serve as an effective learning tool for understanding concepts and solving problems.

Table 2. Descriptive Statistical Analysis

	N Statistic	Range Statistic	Minimum Statistic	Maximum Statistic	Mean Statistic	Std. Deviation Statistic	Variance Statistic	Kurtosis	
								Statistic	Std. Error
TOTALX.1	60	11	12	23	16.90	1.834	3.380	2.532	.608
TOTALX.2	60	8	13	21	17.08	1.759	3.095	.229	.608
TOTALX.3	60	11	13	24	18.00	2.449	6.000	-.216	.608
TOTALX.4	60	15	9	24	15.72	2.387	5.698	2.449	.608
TOTALX.5	60	10	12	22	17.50	1.987	3.949	.447	.608
Valid N (listwise)	60								

The aspect of understanding and using ChatGPT (TOTALX.1) received an average score of 16.90, with the highest kurtosis value (2.532), indicating consistency in respondents' answers regarding this aspect. This means that most students already have a sufficient understanding of how ChatGPT works and how to access it for academic needs. However, the aspect of ethics and responsible use (TOTALX.4) showed the lowest average score, namely 15.72 with a standard deviation of 2.387. This indicates that there are still weaknesses in students' understanding of the ethical use of ChatGPT in accordance with academic principles. This finding is significant, given that Physics Education students are future educators who will eventually influence students' academic culture. Therefore, the need to integrate digital literacy and AI usage ethics into the curriculum is strongly emphasized.

Overall, the average scores for all aspects were above the midpoint of the Likert scale, indicating that students' use of ChatGPT is generally good. However, the variation in scores and perceptions across certain aspects also suggests that the use of this technology remains uneven in terms of understanding, responsibility, and effectiveness. Therefore, guidance and education regarding the use of AI in a learning context must be conducted systematically so that its utilization is not only optimal but also ethical and responsible.

These findings not only demonstrate students' positive response to ChatGPT but also reflect a paradigm shift in the learning process in the digital age. The integration of AI technologies like ChatGPT into higher education demands institutional readiness to provide ethical guidelines, digital literacy training, and adaptive pedagogical approaches. Without systematic guidance, the use of this technology risks fostering a pattern of instant yet superficial learning. Therefore, the role of faculty members as facilitators of technological literacy and academic ethics becomes increasingly crucial in shaping the character and competencies of 21st-century students.

CONCLUSION

Based on the research findings, it can be concluded that the use of ChatGPT by physics education students in completing physics assignments shows a positive trend. Students generally stated that ChatGPT helped them understand physics concepts, solve problems, and increase their motivation to learn. The dimensions of attitude toward use and perception of benefits showed the highest scores, reflecting students' acceptance of this technology as a learning aid. However, the aspects of ethics and responsible use received lower scores, indicating that challenges remain regarding digital literacy and ethical awareness of AI use in an academic context. Therefore, this study recommends that future research involve a broader and more diverse sample, employ a mixed-methods approach to obtain more in-depth qualitative data, and include objective learning outcome variables to assess the direct impact of ChatGPT use on students' academic achievement. Additionally, it is important to develop more detailed

instruments regarding ethical literacy in the use of AI technology to ensure its application in education is more optimal and responsible.

ACKNOWLEDGMENTS

The author would like to express his deepest gratitude to all students of the Physics Education Study Program who were willing to serve as respondents and contribute to the data collection for this study. Thanks are also extended to the lecturers who taught the courses and provided guidance and direction during the writing of this article, enabling the successful completion of this study.

AUTHOR CONTRIBUTIONS

Conceptualization, F.A and S.B.. Methodology, F.A.. Software, F.A.. Validation, F.A. and S.B.. Formal Analysis, F.A.. Investigation, F.A.. Resources, F.A and S.B. Data Curation, F.A. Writing–Original Draft Preparation, F.A. Writing–Review and Editing, F.A. and S.B. Visualization, F.A. Supervision, S.B. Project Administration, F.A.

CONFLICTS OF INTEREST

The authors declare that there is no conflict of interest regarding the publication of this paper. The authors also confirm that this research was conducted without any commercial or financial relationships that could be construed as a potential conflict of interest. Furthermore, no funding sponsors had any role in the design of the study; in the collection, analyses, or interpretation of data; in the writing of the manuscript; or in the decision to publish the results.

REFERENCES

- [1] Supriyono A, Lesmono AD, Prihandono T. Dampak dan Tantangan Pemanfaatan ChatGPT dalam Pembelajaran pada Kurikulum Merdeka: Tinjauan Literatur Sistematis. *J Pendidik Dan Kebud* 2024;9:134–52. <https://doi.org/10.24832/jpnk.v9i2.5214>
- [2] Kasneci E, Sessler K, Küchemann S, Bannert M, Dementieva D, Fischer F, et al. ChatGPT for good? On opportunities and challenges of large language models for education. *Learn Individ Differ* 2023;103:102274. <https://doi.org/10.1016/j.lindif.2023.102274>
- [3] Chen L, Chen P, Lin Z. Artificial Intelligence in Education: A Review. *IEEE Access* 2020;8:75264–78. <https://doi.org/10.1109/ACCESS.2020.2988510>
- [4] Azizah H, Putranta H. The role of ChatGPT technology in students conceptual understanding of quantum physics learning. *WaPFI (Wahana Pendidik Fis* 2025;10:69–86. <https://doi.org/10.17509/wapfi.v10i1.78835>
- [5] Tlili A, Shehata B, Adarkwah MA, Bozkurt A, Hickey DT, Huang R, et al. What if the devil is my guardian angel: ChatGPT as a case study of using chatbots in education. *Smart Learn Environ* 2023;10:15. <https://doi.org/10.1186/s40561-023-00237-x>
- [6] Nurhuda D, Kumala SA, Widiyatun F. ANALISIS KECERDASAN BUATAN CHATGPT DALAM PENYELESAIAN SOAL FISIKA BERGAMBAR PADA MATERI RESISTOR. *J Lumin Ris Ilm Pendidik Fis* 2023;4:62–70. <https://doi.org/10.31851/luminous.v4i2.12232>
- [7] Mafudi I, Kuswanto H, Jumadi J, Fatmawati I. Case Study on ChatGPT's Performance in Assisting Students with Physics Tests. *J Pendidik Fis* 2025;13:41–58. <https://doi.org/10.26618/jpf.v13i1.16624>
- [8] Cotton DRE, Cotton PA, Shipway JR. Chatting and cheating: Ensuring academic integrity in the era of ChatGPT. *Innov Educ Teach Int* 2024;61:228–39. <https://doi.org/10.1080/14703297.2023.2190148>

- [9] Lo CK. What Is the Impact of ChatGPT on Education? A Rapid Review of the Literature. *Educ Sci* 2023;13:410. <https://doi.org/10.3390/educsci13040410>
- [10] Zhai X. ChatGPT User Experience: Implications for Education. *SSRN Electron J* 2022. <https://doi.org/10.2139/ssrn.4312418>
- [11] Rudolph J, Tan S, Tan S. ChatGPT: Bullshit spewer or the end of traditional assessments in higher education? *J Appl Learn Teach* 2023;6. <https://doi.org/10.37074/jalt.2023.6.1.9>
- [12] Nurhuda M et al. Development of AI-based learning perception instruments for university students. *J Educ Assess* 2023;9:55–64.