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The influence of intensity and effectiveness of chatgpt use on critical thinking skills of students at the sekolah tinggi ilmu ekonomi YAPAN

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ABSTRACT

Advances in Artificial Intelligence (AI) technology, particularly ChatGPT developed by OpenAI, have brought changes to various aspects of higher education, including student learning processes. Currently, ChatGPT is widely used as a means to obtain information, assist in completing academic assignments, and support understanding of lecture material. On the other hand, the high level of use of this technology has given rise to various views regarding its impact on students' critical thinking skills. Therefore, this study was conducted to determine the effect of the intensity of ChatGPT use and its effectiveness on the critical thinking skills of STIE YAPAN students. The study used a quantitative approach with a survey method by distributing questionnaires to 193 students selected using a purposive sampling technique. The data obtained were analyzed using multiple linear regression methods with the help of SPSS software. The results showed that the intensity of ChatGPT use did not have a significant effect on students' critical thinking skills, as indicated by a significance value of 0.163 > 0.05. Conversely, the effectiveness of ChatGPT use was proven to have a positive and significant effect on students' critical thinking skills with a significance value of 0.001 < 0.05. In addition, the intensity and effectiveness of ChatGPT use together have a significant effect on students' critical thinking skills, as indicated by a significance value of 0.004 < 0.05.

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1. INTRODUCTION

Entering the era of the Industrial Revolution 4.0 and the transition to Society 5.0, the integration of digital technologies such as Artificial Intelligence (AI) has transformed the global higher education landscape. This transformation shifts the conventional learning paradigm into a collaborative process between humans and cognitive technology (Russell & Norvig, 2021), (Chaudhry & Kazim, 2021). One of the most dominant generative AI innovations is ChatGPT, developed by OpenAI, which has been widely adopted by academics for processing text, compiling reports, and exploring scientific concepts (Strzelecki et al., 2024), (OpenAI, 2023). The global phenomenon shows a tremendous

scale of utilization, the AI Index Report 2024 noted that around 63% of global respondents have heard of ChatGPT (HAI), 2024), while Business Insider 2025 detected the global weekly active user base reaching 800 million people (Insider, 2025). In Indonesia, a Snapcart survey conducted in April 2025 confirmed that approximately 71% of respondents had integrated ChatGPT into their daily and administrative activities, making it the most widely used AI service (Department, 2024).

In higher education, particularly at the YAPAN Surabaya College of Economics (STIE), initial observations indicate that the majority of students have adopted ChatGPT in their academic activities. However, this utilization pattern yields significant variations in the intensity and effectiveness of use. Intensity represents a quantitative aspect, measured by the frequency, duration, and consistency of student interactions with ChatGPT (Hayati et al., 2025), (Mairisiska & Qadariah, 2023). Meanwhile, effectiveness emphasizes the qualitative aspect, namely the extent to which students are able to transform this technology to produce academic output that is valid, efficient, and aligned with learning objectives (Ridwan et al., 2024), (Widiarti & Kasri, 2025). Optimal interaction between the quantity (intensity) and quality (effectiveness) of ChatGPT usage ideally has direct implications for the stimulation of critical thinking skills, a high-level cognitive competency that includes aspects of interpretation, analysis, evaluation, and self-regulation that are crucial for prospective professional workers in the fields of economics and management (Guo & Lee, 2023).

Although ChatGPT's potential as a cognitive aid is recognized as enormous, the actual impact of this digital technology and artificial intelligence on students' critical thinking skills continues to spark contradictory empirical debate. On the one hand, several empirical studies have demonstrated a positive correlation with AI utilization. Research by (Abidin et al., 2026) shows that the synergy between the use of ChatGPT and digital literacy has a significant positive impact on students' critical thinking skills in a technology-based learning ecosystem. Westi Bawarta, Faradika, (2025) explains that ChatGPT, positioned as an interactive virtual tutor, is able to facilitate learning flexibility, which has an impact on improving critical thinking. Furthermore, a study from Sofa et al., (2024) also strengthens this finding by emphasizing that the integration of ChatGPT in the learning process is factually able to increase the critical thinking capacity of students in Islamic higher education environments.

However, on the other hand, the potential for cognitive degradation due to uncontrolled use of ChatGPT remains a serious threat. Nahwiyah et al., (2026) found an anomaly where excessive use of ChatGPT actually triggers pathological dependence on technology, which ultimately degrades students' ability to analyze problems and find solutions independently. This contradiction is exacerbated by the existence of a knowledge gap, where the majority of previous studies tend to generalize ChatGPT use universally without clearly separating the quantitative-behavioral dimension (intensity) and the qualitative-functional dimension (effectiveness), especially for students in socio-economic sciences such as management who have academic cultural characteristics.

Based on the results of previous research, there are still differences in research findings regarding the effect of ChatGPT use on students' critical thinking skills. Some studies indicate that ChatGPT use can improve students' analytical, evaluation, and problem-solving skills, while others find that excessive ChatGPT use can actually reduce critical thinking skills because it creates a dependence on instant answers from AI technology. Furthermore, most previous studies only discuss ChatGPT use in general without distinguishing between the intensity of use and the effectiveness of ChatGPT use in the learning process. This difference indicates a research gap that requires further investigation, particularly regarding the intensity of use and the effectiveness of ChatGPT use in higher education environments.

Furthermore, the phenomenon of ChatGPT usage among university students needs to be understood based on how the technology is utilized in the learning process.

Conceptually, ChatGPT can be used either as a learning tool or as an instant answer provider. As a learning tool, ChatGPT functions as a cognitive support system that helps students understand concepts, explore different perspectives, develop ideas, and analyze various problems. In this context, students remain actively involved in constructing knowledge and evaluating the information they obtain. In contrast, when ChatGPT is used as an instant answer provider, students tend to rely on the technology to obtain final answers quickly without engaging in deeper thinking processes. This condition has the potential to reduce students' involvement in analysis, evaluation, and reflection, which are essential components in the development of critical thinking skills (Kasneci et al., 2023).

The implications of Generative Artificial Intelligence (AI) for the development of higher-order thinking skills have also become an important concern in higher education. On the one hand, the effective use of ChatGPT can help students develop analytical, evaluative, synthesis, problem-solving, and decision-making skills through exploratory and reflective interactions (Guo & Lee, 2023). This technology enables students to access information more broadly and efficiently, thereby supporting deeper learning processes. On the other hand, excessive and uncontrolled use may lead to technological dependency, causing students to become less motivated to think independently. This phenomenon is known as cognitive offloading, which refers to an individual's tendency to delegate part of their thinking processes to technology (Kasneci et al., 2023). Therefore, the impact of ChatGPT usage on students' critical thinking skills is determined not only by how frequently the technology is used but also by how effectively students utilize it as a learning tool. This issue further highlights the importance of examining the influence of ChatGPT usage intensity and effectiveness on the critical thinking skills of STIE YAPAN students.

Therefore, this study was conducted to determine the effect of ChatGPT use intensity and effectiveness on the critical thinking skills of STIE YAPAN students. This research is expected to provide theoretical contributions to the development of science in the field of educational technology and digital learning behavior. Furthermore, this research is also expected to provide considerations for students and educational institutions in using AI technology effectively, wisely, and responsibly to support the learning process and improve students' critical thinking skills.

2. RESEARCH METHODS

This study applies a quantitative approach with an explanatory research focus on examining and explaining the causal relationship between independent and dependent variables. A quantitative approach is a research method used to collect and analyze data from a specific population or sample through statistical techniques, so that it can be used to test previously formulated hypotheses (Sugiyono, 2023; Susanto et al., 2024). This approach was chosen because the study aimed to determine the effect of the intensity of ChatGPT use and the effectiveness of ChatGPT use on students' critical thinking skills.

The independent variables in this study consist of the intensity of ChatGPT use (X1) and the effectiveness of ChatGPT use (X2), while the dependent variable is students' critical thinking skills (Y). The intensity of ChatGPT use (X1) was measured through indicators of usage frequency, duration, and consistency. Meanwhile, the effectiveness of ChatGPT use (X2) was measured through indicators of information relevance, learning support, and task completion efficiency. The study population was all STIE YAPAN students, with a total population of 378 students. The sampling technique used purposive sampling with a total of 193 students as respondents. Purposive sampling is a sampling technique carried out based on certain criteria or considerations in accordance with the research objectives. This technique is used to ensure that the selected

respondents truly match the characteristics required in the study (Nazara, 2026), (Lenaini, 2021). Purposive sampling technique is used because respondents are selected based on certain criteria that suit the research needs.

The research data were collected through the distribution of questionnaires using a five-level Likert scale, consisting of the options strongly agree, agree, neutral, disagree, and strongly disagree. The preparation of the research instrument refers to the indicators that have been determined for each variable studied. The research implementation was carried out in stages, starting from problem identification, instrument development, questionnaire distribution to respondents, data collection, data processing, data analysis, and preparation of research conclusions. Next, the collected data were analyzed with the help of SPSS software through a series of tests that included validity tests, reliability tests, classical assumption tests, multiple linear regression analysis, partial tests (t-tests), simultaneous tests (F-tests), and testing the coefficient of determination. These analysis stages were carried out to determine the magnitude of the influence between the variables studied and to test the hypothesis regarding the influence of the intensity and effectiveness of ChatGPT use on the critical thinking skills of STIE YAPAN students.

3. RESULTS AND DISCUSSION

3.1 Evaluation of Instrument Test and Classical Assumption Test

The results of the instrument testing showed that all statement items on the variable intensity of ChatGPT use (X1), effectiveness of ChatGPT use (X2), and students' critical thinking skills (Y) were declared valid because they had a calculated r value > r table of 0.1413. The Cronbach's Alpha value for each variable was also above the reliability standard of 0.70, namely X1 of 0.841, X2 of 0.896, and Y of 0.906, so the research instrument was declared reliable and had good internal consistency. Furthermore, the results of the normality test showed an Asymp. Sig. (2-tailed) value of 0.072 > 0.05 which proved that the residual data was normally distributed. In the Glejser heteroscedasticity test, the significance value of variable X1 was 0.704 and X2 was 0.227, where both values were greater than 0.05 so that the regression model was free from heteroscedasticity symptoms. Meanwhile, the results of the multicollinearity test showed a Tolerance value of 0.942 > 0.10 and a VIF value of 1.062 < 10.00, so that the regression model was declared free from multicollinearity problems between independent variables.

3.2 Multiple Linear Regression Analysis and Partial t-Test

The results of multiple linear regression analysis were used to determine the effect of ChatGPT usage intensity and effectiveness on students' critical thinking skills. The regression test results can be seen in Table 1 below:

Table 1. Results of Multiple Linear Regression Analysis and Partial t-Test

Coefficientsa						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	33,911	4,192		8,090	.000
	intensity of use	-.106	.076	-.102	-1,401	.163
	effectiveness of use	.213	.064	.241	3,314	.001
a. Dependent Variable: Critical Thinking Skills						

Based on the results of data processing using multiple linear regression analysis presented in Table 1, the following regression equation model was obtained:

$$Y = 33{,}911 - 0{,}106X_1 + 0{,}213X_2 + e$$

The regression equation shows that the variable intensity of ChatGPT use (X1) has a negative relationship of -0.106, while the variable effectiveness of ChatGPT use (X2) has a positive relationship of 0.213 on students' critical thinking skills. The direction of this relationship proves that increasing the effectiveness of ChatGPT use can linearly improve students' critical thinking skills, while increasing the intensity of ChatGPT use tends to decrease students' critical thinking skills.

The partial t-test on the variable of intensity of ChatGPT usage shows a t-count of -1.401 with a significance level of 0.163 > 0.05 so that the value is smaller than the critical limit of t-table of 1.972, which means H0 is accepted and Ha is rejected. These results prove that the intensity of ChatGPT usage does not have a significant effect on students' critical thinking skills partially. Meanwhile, the partial t-test on the variable of effectiveness of ChatGPT usage shows a t-count of 3.314 with a significance level of 0.001 < 0.05 so that the value is greater than the critical limit of t-table of 1.972, which indicates that H0 is rejected and Ha is accepted. Thus, the effectiveness of ChatGPT usage is proven to have a positive and significant effect on STIE YAPAN students' critical thinking skills partially.

3.3 Simultaneous Hypothesis Testing (F Test)

The F-test was conducted to determine the simultaneous influence of independent variables on the dependent variable. The test results are shown in the following table:

Table 2. F Test Results

ANOVA						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	362,836	2	181,418	5,683	.004b
	Residual	6065.123	190	31,922		
	Total	6427.959	192			

a. Dependent Variable: Critical Thinking Skills

Based on the F-test results in Table 2, the calculated F-value is 5.683. This simultaneous test value is greater than the critical limit of F-table of 3.04 with a significance level of 0.004 < 0.05. These results indicate that the variables of ChatGPT usage intensity and ChatGPT usage effectiveness simultaneously (together) have a significant effect on the critical thinking skills of STIE YAPAN students.

3.4 Analysis of the Coefficient of Determination (R2)

The coefficient of determination analysis was conducted to measure the ability of the independent variable to explain the variation that occurs in the dependent variable. The results of the coefficient of determination test are presented in the following table.

Table 3. Coefficient of Determination (R2) of the Regression Model

Model Summary					
Model	R	R Square	Adjusted R Square		Standard Error of the Estimate
1	.238a	.056	.047		5,650

a. Predictors: (Constant), Effectiveness of Use, Intensity of Use

The coefficient of determination showed an R^2 value of 0.056, or 5.6%. This indicates that the variables of ChatGPT usage intensity and ChatGPT usage effectiveness were able to explain students' critical thinking skills by 5.6%, while the remaining 94.4% was influenced by other variables outside the study.

3.5 Discussion

a. The Intensity of ChatGPT Use on Students' Critical Thinking Skills

The research findings indicate that the intensity of ChatGPT use has not significantly influenced the critical thinking skills of STIE YAPAN students. This is evidenced by the results of the partial t-test, which obtained a t-value of -1.401 with a significance level of 0.163 > 0.05, thus H0 is accepted and Ha is rejected. These results indicate that high frequency of ChatGPT use does not necessarily improve students' critical thinking skills.

These findings indicate that excessive use of ChatGPT without independent analysis and evaluation of information can lead to passive thinking in students. Students tend to use ChatGPT for instant answers rather than for problem identification, reference searches, and analysis of learning materials. This condition results in students' reflective thinking and evaluative abilities not developing optimally.

The results of this study are in line with research Nahwiyah et al., (2026), Maulana et al., (2024) which states that excessive use of ChatGPT can lead to technology dependency, making students less active in analyzing and solving problems independently. Furthermore, Ahiri's research also found that high-intensity ChatGPT use does not always have a positive impact on students' critical thinking skills because they tend to receive information without conducting a thorough evaluation process.

Theoretically, the results of this study support the critical thinking theory of Ennis, (1985) which explains that critical thinking skills require reflective, rational, and analytical thinking processes in making decisions. In the context of using ChatGPT, students who focus solely on speed in obtaining answers without critically analyzing the information received will experience a decline in the quality of their thinking processes. Therefore, intensive use of ChatGPT without being balanced with the ability to evaluate information is insufficient to improve students' critical thinking skills.

b. The Effectiveness of Using ChatGPT on Students' Critical Thinking Skills

Based on the analysis, the effectiveness of ChatGPT usage has been shown to have a positive and significant impact on STIE YAPAN students' critical thinking skills. This is evidenced by the partial t-test results, which obtained a t-value of 3.314 with a significance level of 0.001 < 0.05, so H0 is rejected and Ha is accepted. These results indicate that the more effectively students use ChatGPT, the more their critical thinking skills improve.

These findings indicate that effective use of ChatGPT can help students understand learning materials, analyze information, broaden their horizons, and support academic problem-solving. Students who use ChatGPT as a learning aid tend to be more active in evaluating information and developing deeper understanding than those who only use ChatGPT to obtain instant answers.

The findings obtained in this study show consistency with the results of previous research conducted by Durratul Hikmah & Badilatil Walida, (2024), Kasneci et al., (2023) which states that using ChatGPT can help students develop ideas, evaluate academic writing, and improve critical thinking skills in the learning process. Furthermore, Saenal Abidin's research also shows that using ChatGPT, supported by strong digital literacy skills, can improve students' critical thinking skills in technology-based learning.

Theoretically, the results of this study support the critical thinking theory of Facione, (1990) which explains that critical thinking skills encompass the ability to interpret, analyze, evaluate, and infer information received. In the context of using ChatGPT, students who are able to utilize AI technology effectively will find it easier to analyze and evaluate information, thereby optimally developing critical thinking skills.

c. Intensity of ChatGPT Use and Effectiveness of ChatGPT Use on Students' Critical Thinking Skills

Based on the analysis results, the variables of ChatGPT usage intensity and ChatGPT usage effectiveness simultaneously proved to have a significant effect on STIE

YAPAN students' critical thinking skills. This is evidenced by the results of the F test which obtained an F count value of 5.683 with a significance level of 0.004 <0.05, so H0 is rejected and Ha is accepted. These results indicate that both independent variables together have a contribution to students' critical thinking skills.

However, the coefficient of determination of 5.6% indicates that the influence of these two variables is still relatively low. This indicates that students' critical thinking skills are not only influenced by the intensity and effectiveness of ChatGPT use, but also by other factors such as learning motivation, digital literacy skills, lecturer learning methods, the academic environment, and individual student analytical skills.

The findings of this study indicate that the use of ChatGPT in educational settings has the potential to provide positive benefits if used appropriately and responsibly. High frequency of ChatGPT use does not automatically improve students' critical thinking skills if it is not accompanied by effective utilization. Conversely, the use of ChatGPT focused on supporting analysis, evaluation, and information retrieval and development can help improve students' critical thinking skills in learning activities at universities.

Furthermore, the regression analysis results indicate that the regression coefficient of ChatGPT usage effectiveness (β = 0.213) is greater than the regression coefficient of ChatGPT usage intensity (β = -0.106). This finding implies that the quality of ChatGPT utilization has a more dominant role in improving students' critical thinking skills than merely the frequency or duration of use. In other words, students who are able to use ChatGPT effectively as a learning support tool tend to demonstrate better critical thinking skills compared to students who only use ChatGPT intensively. Therefore, efforts to improve students' critical thinking skills should not focus solely on increasing the intensity of AI usage, but rather on enhancing students' ability to utilize ChatGPT appropriately, critically, and in accordance with learning objectives.

Temuan ini menunjukkan bahwa peningkatan kemampuan berpikir kritis mahasiswa tidak ditentukan oleh seberapa sering ChatGPT digunakan, melainkan oleh sejauh mana teknologi tersebut dimanfaatkan secara efektif untuk mendukung proses analisis, evaluasi, dan pemecahan masalah dalam pembelajaran.

4. CONCLUSIO

Based on the results of the research that has been conducted, it can be concluded that the intensity of ChatGPT use does not have a significant impact on the critical thinking skills of STIE YAPAN students. This finding indicates that the high frequency of ChatGPT use does not automatically improve students' critical thinking skills, especially if its use is only focused on finding answers quickly without involving independent reasoning, analysis, and evaluation processes. Conversely, the effectiveness of ChatGPT use has been proven to have a positive and significant impact on students' critical thinking skills. These results indicate that the use of ChatGPT when carried out appropriately and in accordance with learning objectives can help students understand the material more deeply, analyze various information, and improve evaluation and problem-solving skills.

Furthermore, the results of this study indicate that the intensity of ChatGPT use and its effectiveness simultaneously significantly influence the critical thinking skills of STIE YAPAN students. However, the coefficient of determination obtained indicates that critical thinking skills are influenced not only by these two variables but also by other factors not examined in this study, such as learning motivation, digital literacy level, applied learning methods, academic environment, and analytical skills of each student.

Overall, this research confirms that the success of Artificial Intelligence (AI) technology in education is not solely determined by the intensity of its use. A more important factor is how the technology is used effectively, critically, and responsibly so that it can function as a learning support tool that can encourage the development of students' critical thinking skills.

These findings contribute to the development of AI-based learning theory by demonstrating that the success of AI utilization in learning is determined more by the effectiveness of its use than by the intensity of its use. The results reinforce the view that AI functions as a learning support tool capable of enhancing students' critical thinking skills when utilized appropriately, critically, and in accordance with learning objectives (Kasneci et al., 2023). In addition, the findings suggest that indicators of successful ChatGPT usage in future learning evaluations may include students' ability to understand learning materials, analyze information, evaluate knowledge sources, solve academic problems, and support critical decision-making processes.

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