Journal of Educational Sciences
Journal homepage: https://jes.ejournal.unri.ac.id/index.php/JES
P-ISSN 2581-1657
E-ISSN 2581-2203

The Simultaneous Influence of AI Literacy and Prompting Skills on Students' Critical Thinking Disposition

Fitri Azzahra Hanifatunnisa, Jaka Septiadi*
Information Systems and Technology Education, Universitas Pendidikan Indonesia, Bandung, 40154, Indonesia

ARTICLE INFO

Article history:

Received: 21 Dec 2025
Accepted: 28 April 2026
Available Online: 05 May 2026

Keywords:

AI Literacy,
Critical Thinking Disposition,
Generative AI,
Prompting Skills,
University Students

* *Corresponding author:*

E-mail: jakaseptiadi@upi.edu

Article Doi:

https://doi.org/10.31258/jes.10.5.p.112-125

A B S T R A C T

This study examines the influence of AI Literacy and Prompting Skills on university students' Critical Thinking Disposition in the context of Generative AI use in higher education. A quantitative cross-sectional survey design was employed. The population consisted of 354 students from the Educational System and Information Technology Study Program at Universitas Pendidikan Indonesia, with 188 respondents selected using Slovin's formula and purposive sampling. Data were collected through a closed-ended questionnaire using a five-point Likert scale to measure AI Literacy, Prompting Skills, and Critical Thinking Disposition. Data were analyzed using descriptive statistics and multiple linear regression after all classical assumptions were met. The results show that all variables are categorized at a high level. Partially, AI Literacy and Prompting Skills each have a positive and significant effect on Critical Thinking Disposition. Simultaneously, both variables explain 46.4 percent of the variance in students' Critical Thinking Disposition. These findings indicate that students' critical thinking disposition in the era of Generative AI is influenced by both conceptual understanding and technical competence in interacting with AI. Therefore, strengthening AI literacy and prompting skills should be integrated into higher education learning development strategies.

1. Introduction

The development of digital technology in the 21st century has changed how people learn, work, and interact, making digital transformation a necessity in education. Higher education, as a link between education and societal needs, is one of the sectors most affected by digital learning ecosystems such as Learning Management Systems (LMS), online learning resources, and academic collaboration platforms (Tang et al., 2025; Islami et al., 2025). In this landscape of digital transformation, artificial intelligence (AI) has emerged as one of the key innovations driving change in the way lecturers and students design, access, and produce knowledge (Okoye et al., 2022). Among the various forms of AI, Generative AI (GenAI) is beginning to

occupy an important position due to its ability to generate text, images, and other content that resembles human work. The presence of Generative AI in higher education not only changes the way students access information, but also influences their thought processes, decision-making, and academic knowledge production (Kasneci et al., 2023; Dwivedi et al., 2023).

The application of Generative AI has triggered significant changes in learning practices in higher education (Gea et al., 2025). This technology is no longer a prospective innovation, but a real part of students' academic activities due to its perceived ease of use and usefulness (Ivanov et al., 2024; Vieriu & Petrea, 2025, Yusriani & Fithriani, 2025; Al Farizy et al., 2025; Amara et al., 2025). However, this widespread use also triggers differing views among academics regarding the influence of GenAI on learning quality and dynamics. On the one hand, GenAI is viewed positively as a tool that can enhance cognitive engagement (Liang et al., 2023) and students' creative self-efficacy (Shah et al., 2025). On the other hand, there are significant concerns that AI could pose a serious threat to academic integrity (Dewantara & Dewi, 2025; Yusuf et al., 2024), particularly in relation to the risks of cognitive laziness and plagiarism, which ultimately raise fundamental questions about how this technology affects students' attitudes and willingness to think originally. A number of studies also warn that the use of Generative AI without adequate literacy and cognitive control has the potential to encourage academic dependence and reduce the quality of students' critical thinking (Cotton et al., 2024).

Amidst the debate over the use of GenAI in higher education, critical thinking is seen as a core competency that must be maintained so that students do not simply accept AI answers, but are able to analyze and evaluate them reflectively against the information generated (Larson et al., 2024; Refaldi et al., 2024). Over-reliance on technology that is not properly managed has the potential to encourage cognitive offloading and weaken students' analytical acuity (Gerlich, 2025). In line with this, a systematic review also shows that over-reliance on AI dialogue systems can have an impact on the decline of essential cognitive abilities, including critical thinking and analytical reasoning, making the strengthening of literacy to critically evaluate AI output an important necessity in the educational environment (Zhai et al., 2024). Therefore, the use of AI needs to be understood through two main competencies: AI literacy, which is conceptual understanding and critical awareness of the implications and limitations of technology (Casal-Otero et al., 2023; Ng et al., 2021, Sukma & Hikmawan, 2026), and Prompting Skills, which is the technical ability to design and revise instructions so that AI produces meaningful responses (Cain, 2024; Oppenlaender et al., 2025). However, research that explicitly tests the combined contribution of these two competencies to higher-order cognitive outcomes, particularly students' critical thinking dispositions, is still relatively limited.

To date, research examining AI literacy and its relationship to critical thinking among students still shows a number of limitations. A systematic review of AI literacy in higher education indicates that AI literacy has been recognized as an essential competency, but most studies still focus on conceptual urgency and have

not yet tested its impact on higher-order cognitive outcomes (Aysya et al., 2025). In the Indonesian context, Sari et al. (2025) measured students' AI literacy through four main dimensions: awareness of AI; use of AI technology; evaluation of AI content and output; and ethics in the use of AI. However, the findings were limited to a descriptive overview without linking AI literacy to critical thinking dispositions. On the other hand, Lee and Palmer (2025), through a systematic review of prompt engineering in higher education, positioned prompt design skills as a new form of digital competence, but did not provide empirical evidence regarding the influence of these skills on student learning outcomes or cognitive dispositions. Meanwhile, Karakuş (2024) shows that critical thinking dispositions can be predicted by cognitive flexibility, but the variables examined are still general psychological ones and do not include specific competencies related to the use of GenAI. Therefore, there is still a research gap, namely the absence of studies that simultaneously model AI literacy and prompting skills as predictors of students' critical thinking dispositions in the context of GenAI utilization in higher education.

To address this gap, the novelty of this research lies in the clear distinction between AI Literacy and Prompting Skills as two competencies that are operationalized and measured quantitatively, as well as in testing the simultaneous contribution of both to students' Critical Thinking Dispositionan approach that has not been widely adopted in studies of AI literacy, prompt engineering, and critical thinking disposition in higher education (Aysya et al., 2025; Karakuş, 2024; Lee & Palmer, 2025; Sari et al., 2025). Based on this context, this study explicitly aims to analyze the partial and simultaneous effects of AI literacy and prompting skills on the critical thinking disposition of students utilizing Generative AI.

2. Methodology

This study uses a quantitative approach with a cross-sectional survey design. The research population includes all students of the Information Systems and Technology Education Study Program (PSTI), Indonesia University of Education (UPI), UPI Campus in Purwakarta, who actively use Generative AI technology, with a total of 354 students. PSTI students come from various batches and have academic backgrounds in educational technology, so they are accustomed to using Learning Management Systems, online learning resources, and AI-based tools in their academic activities. To determine the sample size, this study used the Slovin formula, which is commonly used in quantitative research to calculate the Slovin sample size with a certain margin of error (Riyanto, 2022). Using the Slovin formula as follows $n = \frac{N}{1 + N\,(e)^2}$. The Slovin formula with a margin of error of 5% is used to determine the minimum sample size (n) from a population (N) so that the research estimation results have a maximum error rate of 5% against the actual population parameters. Sampling was conducted using purposive sampling techniques to ensure that respondents had relevant experience in using AI tools.

Data collection was conducted using a closed-ended questionnaire with a five-point Likert scale. The instrument consisted of 30 statements adapted from indicators

from various recent studies. The AI literacy variable was measured using 10 statements developed from a conceptual and ethical understanding framework (Chiu et al., 2024; Kong et al., 2024; Yim, 2024). The Prompting Skills variable refers to the technical aspects of instruction formulation (Lee & Palmer, 2025; Oppenlaender, 2025; Walter, 2024). Meanwhile, the Critical Thinking Disposition instrument was constructed based on evaluative and analytical indicators (Liu et al., 2021; Zhai & Zhang, 2023). Before distribution, the instruments underwent Pearson Product Moment validity testing and Cronbach's Alpha reliability testing. Based on the criteria proposed by Riyanto (2022), an instrument is considered reliable if it has an Alpha coefficient > 0.60, and the results of the pilot test in this study showed that all variables had an Alpha value > 0.90 (Very Reliable).

Upon confirming the high validity and reliability of the research instruments, the collected data were subsequently processed and analyzed using IBM SPSS software version 26.0. The analytical procedure was systematically carried out in several stages, beginning with descriptive statistics to map the general profile and categorization of the respondents' scores across the three main variables. Following this, a series of classical prerequisite tests encompassing normality, linearity, multicollinearity, and heteroscedasticity were strictly conducted. These prerequisite evaluations are mandatory to ensure that the dataset completely fulfills the foundational regression assumptions required for parametric testing (Riyanto, 2022). Once all statistical assumptions were demonstrably met, the final hypothesis testing was conducted using multiple linear regression analysis. This specific analytical approach was chosen to rigorously evaluate the predictive power of the model, enabling the researchers to measure both the simultaneous contribution (F-test) of AI literacy and prompting skills, and their individual partial effects (t-test) on the students' critical thinking disposition.

3. Results and Discussion

This section presents the results of data analysis compiled in accordance with the research problem formulation, including descriptive statistics, regression prerequisite tests, and hypothesis testing regarding the influence of AI Literacy and Prompting Skills on students' Critical Thinking Disposition. This study involved 188 students as respondents selected through purposive sampling. The data obtained from the questionnaire was then analyzed descriptively to determine the statistical profile of the variables of AI Literacy (X_1), Prompting Skills (X_2), and Critical Thinking Disposition (Y). An overview of the research data is presented in Table 1.

Table 1. Descriptive Statistics

Variable	N	Mean	Std. Deviation	Minimum	Maximum	General Category
AI Literacy	188	39,76	5,969	18	50	Height
Prompting Skills	188	38,98	5,598	15	50	Height
Critical Thinking Disposition	188	43,02	5,673	21	50	Height

Based on the descriptive statistics in Table 1, the three research variables show average scores in the high category within the theoretical range of 10–50. Descriptively, the results of the study show that students' AI literacy, prompting skills, and critical thinking dispositions are in the high category. This finding is interesting when linked to the context of GenAI utilization, which is now increasingly widespread in higher education as described in the introduction, where GenAI is seen as both an opportunity and a challenge for the learning process (Gea et al., 2025; Ivanov et al., 2024; Vieriu & Petrea, 2025). Amid concerns about the potential decline in academic integrity and the increase in plagiarism in the use of GenAI (Dewantara & Dewi, 2025; Yusuf et al., 2024), these descriptive results indicate that the research respondents are not passive users but have relatively good conceptual knowledge and reflective attitudes in interacting with AI.

After obtaining a descriptive overview for each variable, the next step is to check whether the data used meets the prerequisites for regression analysis, particularly in relation to the distribution of scores. Linear regression requires that the data be normally distributed, so a normality test must be performed on the AI Literacy, Prompting Skills, and Critical Thinking Disposition scores. In this study, the check was performed using the Kolmogorov–Smirnov test at a significance level of 5%. The test results form the basis for assessing the suitability of using multiple linear regression in inferential analysis, and are summarized in Table 2.

Table 2. Normality Test Results

Variable	N	Test Statistic	Asymp. Sig.
Unstandardized Residual	188	0,047	0,200

Based on the empirical analysis results presented in Table 2, a Kolmogorov-Smirnov test statistic value of 0.047 was obtained , accompanied by a significance value (Asymp. Sig. 2-tailed) of 0.200. Given that the significance value obtained is substantially greater than the predetermined significance level of 0.05 ($p > 0.05$) , the null hypothesis which posits that the data follows a normal pattern is accepted. Consequently, it can be confidently concluded that the residual data in this study is normally distributed. This finding indicates that the distribution of errors between the predicted and actual values is symmetrical and not systematically skewed, which is a fundamental and non-negotiable requirement for parametric statistical procedures. With this crucial normality assumption robustly fulfilled, the dataset provides a solid statistical foundation, ensuring that the multiple linear regression analysis will yield valid, unbiased, and reliable estimations regarding the variables under investigation. Therefore, the regression model is declared methodologically suitable for use in further inferential analysis, allowing the research to smoothly proceed to the next phase of prerequisite evaluation, namely the linearity test. The detailed empirical results of this linearity test are presented in Table 3.

Table 3. Linearity Test Results

	Sum of Squares	df	Mean Square	F	Sig.
X_1*Y	647,385	23	28,147	1,368	0,134
X_2*Y	540,186	24	22,508	1,038	0,422

Following the confirmation of data normality, a linearity test was systematically conducted to ensure that the relationship between the independent variables (AI Literacy and Prompting Skills) and the dependent variable (Critical Thinking Disposition) could be strictly assumed to be linear. Establishing this linear relationship is a crucial prerequisite so that the use of multiple linear regression models remains statistically appropriate and can produce accurate predictive values. Based on Table 3, the Sig. Deviation from Linearity value for the relationship between AI Literacy (X_1) and Critical Thinking Disposition (Y) is 0.134, which is greater than 0.05. For the relationship between Prompting Skills (X_2) and Critical Thinking Disposition (Y), the Sig. Deviation from Linearity value is also above 0.05, namely 0.422. Both results indicate that there is no significant deviation from the linear relationship between each independent variable and the dependent variable, thus fulfilling the assumption of linearity in the multiple regression model.

A multicollinearity test was conducted to ensure that there was no strong correlation between the independent variables. The analysis results show that the Tolerance value is > 0.10 and the Variance Inflation Factor (VIF) value is < 10.00 for all variables, indicating that there is no multicollinearity. Meanwhile, the heteroscedasticity test was conducted using the Glejser test method by regressing the absolute residual value against the independent variable. This specific step is essential to confirm that the variance of the residuals remains constant (homoscedasticity), thereby preventing biased or inefficient estimations in the regression coefficients. The detailed results of the multicollinearity and heteroscedasticity tests are presented in Table 4.

Table 4. Results of Multicollinearity and Heteroscedasticity Tests (Glejser Test)

Variable	Multicollinearity		Heteroscedasticity	
	Tolerance	VIF	t	Sig.
AI Literacy (X_1)	0,832	1,202	-1,881	0,062
Prompting Skills (X_2)	0,832	1,202	-1,972	0,051

Based on the table above, the Tolerance value for the AI Literacy and Prompting Skills variables is 0.832 > 0.10 and the VIF value is 1,202 < 10.00. This indicates that there is no strong correlation between the independent variables, so the regression model is free from multicollinearity. Similarly, testing using the Glejser Test by regressing the absolute residual value against the independent variables, the analysis results show a significance value (Sig.) for the AI Literacy variable of 0.062 and Prompting Skills of 0.051. Since both significance values are greater than 0.05 ($p > 0.05$), it can be concluded that there is no heteroscedasticity problem in the regression model. After confirming that all classical prerequisite tests were fully met without any violations, multiple linear regression analysis was performed to systematically test the effect of the AI Literacy (X_1) and Prompting Skills (X_2) variables on students' Critical Thinking Disposition (Y). This comprehensive analysis aimed not only to develop a predictive regression equation and prove the partial hypothesis (the individual effect of each independent variable via the t-test), but also to evaluate the simultaneous contribution of both variables (via the F-test). Furthermore, this analytical step is crucial for determining the coefficient of determination, which reveals how much variance in the critical thinking disposition

can be explained by the formulated model. The detailed statistical results of the multiple linear regression analysis used to answer these research objectives are presented in Table 5.

Table 5. Multiple Linear Regression Analysis Results

Model	Unstandardized Coefficients		t	Sig.
	B	Std. Error		
(Constant)	10,739	2,541	4,226	0,000
AI Literacy (X_1)	0,413	0,058	7,062	0,000
Prompting Skills (X_2)	0,407	0,059	6,839	0,000

Based on Table 5, the multiple linear regression equation for the dependent variable Critical Thinking Disposition (Y) is as follows: $Y = 10.739 + 0.413X_1 + 0.407X_2$. The constant value of 10.739 represents the baseline value of Critical Thinking Disposition when the AI Literacy (X_1) and Prompting Skills (X_2) scores are theoretically at zero. The positive regression coefficients for both independent variables indicate that an increase in AI Literacy and Prompting Skills scores tends to be followed by an increase in Critical Thinking Disposition scores. Specifically, in response to the first research question, the partial test results show that AI Literacy (X_1) has a positive and significant effect on Critical Thinking Disposition. The unstandardized regression coefficient for AI Literacy is 0.413 with a t-value of 7.062 and a significance value of $p < 0.001$, which is smaller than the significance level of 0.05 and accompanied by a t-value greater than the t-table (1.97). This condition indicates that the higher the AI Literacy of students, the higher their tendency to think critically. This finding suggests that students who possess stronger conceptual understanding, critical awareness, and ethical sensitivity regarding AI also tend to report stronger dispositions to analyze, evaluate, and reflect on information critically.

These findings are in line with previous studies showing that strengthening AI literacy contributes positively to the development of students' evaluative and reflective abilities in technology-based learning (Rahman et al., 2024; Sari & Rosana, 2024). AI literacy in this context encompasses not only technical knowledge but also conceptual understanding and critical awareness of the ethical, social, and technological limitations of AI (Casal-Otero et al., 2023; Ng et al., 2021). Such understanding may help students question, test, and evaluate GenAI outputs before accepting them as a basis for academic judgment or decision-making, as emphasized by Larson et al. (2024) and Refaldi et al. (2024) in the context of AI-based higher education. Importantly, AI literacy shows a marginally larger coefficient than prompting skills (B = 0.407), which indicates that, in this model, AI literacy is the slightly more dominant variable. Although the difference is small, this pattern suggests that conceptual and critical understanding of AI may play a somewhat stronger role than technical interaction skills alone in relation to students' critical thinking disposition. On the other hand, these findings reinforce the literature review that places AI literacy as an essential competency in higher education (Aysya et al., 2025), while complementing the research by Sari et al. (2025) mapping the level of AI literacy among Indonesian students, showing that

variations in AI literacy are associated with critical thinking disposition, not just with demographic characteristics and access to technology.

Similarly, answering the second problem formulation, Prompting Skills (X_2) are also proven to have a positive and significant effect on Critical Thinking Disposition. The unstandardized regression coefficient for Prompting Skills is 0.407 with a t-value of 6.839 and a significance value of $p < 0.001$, so that the p-value is again smaller than 0.05 and the t-value exceeds the t-table (1.97). These findings indicate that improvements in students' ability to compose and manage prompts to GenAI are significantly related to improvements in their Critical Thinking Disposition. The process of composing, testing, and revising prompts requires students to clarify objectives, select relevant keywords and contexts, and assess the quality of responses generated by GenAI. This iterative activity is associated with increased cognitive engagement and creativity, which have previously been found in the use of GenAI (Liang et al., 2023; Shah et al., 2025), while also preventing students from simply accepting answers automatically. These findings provide empirical support for the view that prompting skills are a technical competency that determines the depth of interaction with AI (Cain, 2024; Oppenlaender et al., 2025), and confirm the findings of Lee and Palmer (2025), who position prompt engineering as a new digital competency that needs to be taught in higher education, although they simultaneously highlight the limited quantitative evidence regarding its impact on learning outcomes and critical thinking skills. Thus, prompting skills should not be understood merely as an operational ability to use AI tools, but also as a strategic form of interaction that is empirically related to students' tendency to engage more reflectively and analytically with GenAI outputs. Furthermore, the explanatory power of the regression model was evaluated using the coefficient of determination (R^2), the results of which are presented in Table 6.

Table 6. Results of The Coefficient of Determination (R^2) Test Analysis

Model	R	R Square	Adjusted R Square	Std. Error
1	0,685	0,469	0,464	4,155

In response to the third research question, the results of the coefficient of determination analysis in Table 6 show that the regression model containing AI Literacy (X_1) and Prompting Skills (X_2) is able to explain 46.4% of the variation in students' Critical Thinking Disposition (Adjusted $R^2 = 0.464$), while the remaining 53.6% is influenced by other factors outside the model under study. Simultaneous testing through the F test in Table 7 produced an F_{count} value of 81.825 with a significance of $p < 0.001$, which means that the F_{count} value is much greater than the F_{table} value of 3.04 at degrees of freedom $df_1 = 2$ and $df_2 = 185$ and a p value of less than 0.05. Thus, the third hypothesis can be accepted, so it can be concluded that AI Literacy and Prompting Skills together have a positive and significant effect on students' Critical Thinking Disposition.

These results indicate that these two competencies work complementarily in shaping how students use and interpret GenAI in the learning process. AI literacy

helps students understand the potential and limitations of GenAI so that they are more sensitive to the risks of cognitive laziness and the dulling of analytical abilities that are widely feared in the literature on cognitive offloading (Gerlich, 2025), while prompting skills enable them to direct their interactions with GenAI to stimulate analysis and reflection, rather than simply copying answers. Thus, these findings provide nuance to the debate raised in the introduction: among students with stronger AI literacy and prompting skills, GenAI may be more likely to function as a thinking partner that supports reflective engagement (Larson et al., 2024) rather than being used in ways that may weaken active thinking. At the same time, the remaining 53.6% of unexplained variance indicates that critical thinking disposition is also likely influenced by other factors not included in the present model, such as self-regulated learning, cognitive flexibility, academic motivation, academic integrity orientation, prior digital experience, or broader learning-context variables. Therefore, AI literacy and prompting skills should be interpreted as important associated variables, but not as the sole determinants of students' critical thinking disposition. The findings of this study also expand on previous research on the determinants of critical thinking disposition. Karakuş (2024) showed that cognitive flexibility plays an important role in explaining variations in students' critical thinking disposition, while this study adds that specific competencies related to the use of GenAI, namely AI literacy and prompting skills, also make a significant contribution. More importantly, the present findings suggest that conceptual competence in understanding AI and technical competence in interacting with AI work in a complementary manner in relation to students' critical thinking disposition. This complementary pattern is important for higher education because it implies that students need not only access to AI tools, but also the conceptual, evaluative, and strategic capacities required to use such tools critically and responsibly. The practical implication of these findings is the need for higher education to explicitly integrate the strengthening of AI literacy and prompting skills into the curriculum and learning practices, in line with recommendations for the development of AI literacy and competencies in higher education (Aysya et al., 2025; Lee & Palmer, 2025).

Nevertheless, these findings need to be interpreted cautiously in light of the limitations of the study design. First, because this study employed a cross-sectional design, the results do not provide sufficient basis for drawing strong causal conclusions. Accordingly, the relationships identified in this study should be interpreted as associative or correlational rather than causal. In other words, although students with higher AI literacy and prompting skills tend to report higher critical thinking disposition, the present data do not establish that AI literacy or prompting skills directly cause an increase in critical thinking disposition. It is equally plausible that students who already have stronger critical thinking disposition are more likely to develop better AI literacy and prompting practices, or that the relationship may be reciprocal. Second, the use of self-report questionnaires as the sole source of data may introduce bias that affects the validity of the findings. Because AI literacy, prompting skills, and critical thinking disposition were all measured through respondents' self-perceptions, the results may be influenced by social desirability bias, self-enhancement bias, or respondents' tendency to overestimate their actual competence in using AI. In

addition, measuring all variables using the same method raises the possibility of common method bias, which may strengthen the observed associations among variables. Therefore, the findings of this study are more accurately interpreted as reflecting perceived competencies and dispositions rather than directly observed performance. Third, the sample was limited to students from one study program, which may restrict the broader generalizability of the findings. For this reason, caution is needed in extending these results to students from other disciplinary, institutional, or cultural contexts without further empirical confirmation. Future research could address these limitations by employing longitudinal or experimental designs in order to examine the direction of the relationships more rigorously. In addition, future studies could incorporate other relevant variables, such as self-regulated learning, academic integrity, cognitive flexibility, or learning environment, to explain the remaining variance in critical thinking disposition more comprehensively. The inclusion of performance-based assessments, prompt-quality analysis, classroom observation, or mixed-method approaches would also strengthen the robustness of the findings by reducing dependence on self-report data alone.

Overall, this study confirms that AI literacy and prompting skills are both significant and meaningful variables associated with students' critical thinking disposition in the context of GenAI use in higher education. However, their contribution should be understood within an inferential and non-causal framework: they are important correlates of critical thinking disposition, not definitive causal determinants. Therefore, the main practical implication of this study is that higher education institutions should develop AI literacy and prompting skills as complementary competencies that support students' reflective, analytical, and responsible engagement with GenAI.

4. Conclusion

This study concludes that the student respondents possess high levels of AI literacy, prompting skills, and critical thinking dispositions, indicating their readiness to interact with GenAI in an academic context. Partially, AI Literacy was proven to have a positive and significant effect on Critical Thinking Disposition, meaning that the better the conceptual understanding and critical awareness of AI, the stronger the tendency for students to think critically. Prompting Skills also had a positive and significant effect on Critical Thinking Disposition, meaning that the ability to design, modify, and evaluate prompts to GenAI contributed to strengthening students' tendency to reflectively examine and question information. Simultaneously, both variables contribute significantly to variations in Critical Thinking Disposition, thus confirming that efforts to develop AI literacy and prompting skills need to be positioned as an integral part of higher education strategies to maintain and strengthen students' critical thinking disposition amid the increasing use of GenAI in the learning process.

References

Al Farizy, S., Khatimah, K., & Irawati, I. (2025). Exploring Students' Perceptions of AI in Self-directed Speaking Practice: A Case Study at STKIP Taman Siswa Bima. *Journal of Educational Sciences*, *9*(4), 2496–2505. https://doi.org/10.31258/jes.9.4.p.2496-2505

Amara, R., Rahmah, L. S., & Ruswandi, R. (2025). The University EFL Students' Perceptions of QuillBot as an AI-based Tool for Enhancing Paraphrasing Skills and Academic Writing in English. *Journal of Educational Sciences, 9*(5), 4298–4307. https://doi.org/10.31258/jes.9.5.p.4298-4307

Cain, W. (2024). Prompting Change: Exploring Prompt Engineering in Large Language Model AI and Its Potential to Transform Education. *TechTrends*, 68, 47–57. https://doi.org/10.1007/s11528-023-00896-0

Casal-Otero, L., Català, A., Fernández-Morante, C., Taboada, M., Cebreiro, B., & Barro, S. (2023). AI Literacy in K-12: A Systematic Literature Review. *International Journal of STEM Education, 10*(29). https://doi.org/10.1186/s40594-023-00418-7

Chiu, T. K. F., Chen, Y., Yau, K. W., Chai, C.-S., Meng, H., King, I., Wong, S., & Yam, Y. (2024). Developing and Validating Measures for AI Literacy Tests: From Self-reported to Objective Measures. *Computers and Education: Artificial Intelligence, 7*, 100282. https://doi.org/10.1016/j.caeai.2024.100282

Cotton, D. R. E., Cotton, P. A., & Shipway, J. R. (2024). Chatting and Cheating: Ensuring Academic Integrity in the Era of ChatGPT. *Innovations in Education and Teaching International, 61*(2), 228–239. https://doi.org/10.1080/14703297.2023.2190148

Dewantara, B. A., & Dewi, L. K. (2025). Generative AI dalam Pembelajaran Mahasiswa: Antara Inovasi Pendidikan dan Integritas Akademik. *JIIP (Jurnal Ilmiah Ilmu Pendidikan), 8*(7), 8209–8217. https://doi.org/10.54371/jiip.v8i7.8680

Dwivedi, Y. K., et al. (2023). So What if ChatGPT Wrote it? Multidisciplinary Perspectives on Opportunities, Challenges and Implications of Generative Conversational AI. *International Journal of Information Management*, 71, 102642. https://doi.org/10.1016/j.ijinfomgt.2023.102642

Gea, N., Nehe, I., Zalukhu, L., Telaumbanua, M., & Bawamenewi, A. (2025). Dampak Artificial Intelligence (AI) dalam Pendidikan: Peluang dan Tantangan di Era Digital. *Jurnal Education and Development, 13*(1), 637–644. https://doi.org/10.37081/ed.v13i1.6680

Gerlich, M. (2025). AI Tools in Society: Impacts on Cognitive Offloading and the Future of Critical Thinking. *Societies, 15*(1), 6. https://doi.org/10.3390/soc15010006

Islami, A. P., Putri, S. A., & Hasibuan, H. N. H. D. (2025). Exploring Innovations in Teaching, Assessment, and Technology for English Language Education in Indonesian Tertiary Education. *Journal of Educational Sciences, 9*(6), 5452–5465. https://doi.org/10.31258/jes.9.6.p.5452-5465

Ivanov, S., Soliman, M., Tuomi, A., Alkathiri, N. A., & Al-Alawi, A. N. (2024). Drivers of Generative AI Adoption in Higher Education Through the Lens

of the Theory of Planned Behaviour. *Technology in Society*, 77, 102521. https://doi.org/10.1016/j.techsoc.2024.102521

Karakuş, İ. (2024). University students' Cognitive Flexibility and Critical Thinking Dispositions. *Frontiers in Psychology*, 15, 1420272. https://doi.org/10.3389/fpsyg.2024.1420272

Kasneci, E., Sessler, K., Küchemann, S., Bannert, M., Dementieva, D., Fischer, F. (2023). ChatGPT for Good? On Opportunities and Challenges of Large Language Models for Education. *Computers & Education*, 195, 104720. https://doi.org/10.1016/j.lindif.2023.102274

Kong, S.-C., Cheung, M.-Y. W., & Tsang, O. (2024). Developing an Artificial Intelligence Literacy Framework: Evaluation of a Literacy Course for Senior Secondary Students Using a Project-based Learning Approach. *Computers and Education: Artificial Intelligence*, 6, 100214. https://doi.org/10.1016/j.caeai.2024.100214

Larson, R. B., Hogan, M., & Rigby, C. S. (2024). Critical Thinking in the Age of Generative AI. *Academy of Management Learning & Education, 23*(3), 373–378. https://doi.org/10.5465/amle.2024.0338

Lee, D. A., & Palmer, E. (2025). Prompt Engineering in Higher Education: A Systematic Review to Help Inform Curricula. *International Journal of Educational Technology in Higher Education*, 22, 7. Https://Doi.Org/10.1186/S41239-025-00503-7

Liang, J., Wang, L., Luo, J., Yan, Y., & Fan, C. (2023). The Relationship Between Student Interaction with Generative Artificial Intelligence and Learning Achievement: Serial Mediating Roles of Self-efficacy and Cognitive Engagement. *Frontiers in Psychology*, 14, 1285392. https://doi.org/10.3389/fpsyg.2023.1285392

Liu, Z., Li, S., Shang, S., & Ren, X. (2021). How Do Critical Thinking Ability and Critical Thinking Disposition Relate to the Mental Health of University Students? *Frontiers in Psychology*, *12*. https://doi.org/10.3389/fpsyg.2021.704229

Mahadewi, M. P., Aysya, A. A. A., Sofiyani, Z., & Fahmi, F. (2025). The Importance of Literacy on Artificial Intelligence for the Higher Education Students: A Systematic Literature Review. *International Journal of Advances in Data and Information Systems, 6*(1), 1–14. https://doi.org/10.59395/ijadis.v6i1.1350

Ng, D. T. K., Leung, J. K. L., Chu, K. W. S., & Qiao, M. S. (2021). AI Literacy: Definition, Teaching, Evaluation and Ethical Issues. *Proceedings of the Association for Information Science and Technology, 58*(1), 504-509. https://doi.org/10.1002/pra2.487

Okoye, K., Hussein, H., Arrona-Palacios, A., et al. (2023). Impact of Digital Technologies Upon Teaching and Learning in Higher Education in Latin America: An Outlook on the Reach, Barriers, and Bottlenecks. *Education and Information Technologies*, 28, 2291–2360. https://doi.org/10.1007/s10639-022-11214-1

Oppenlaender, J., Linder, R., & Silvennoinen, J. (2025). Prompting AI Art: An Investigation into the Creative Skill of Prompt Engineering. *International Journal of Human-Computer Interaction, 41*(16), 10207–10229. https://doi.org/10.1080/10447318.2024.2431761

Rahman, A., Nugroho, Y., & Lestari, D. (2024). Literasi AI dan Kesiapan Mahasiswa Menghadapi Pembelajaran Berbasis Kecerdasan Buatan. *Jurnal Teknologi Pendidikan, 26*(2), 145–158.

Refaldi, D. A., Faiz, A., Jawakory, M. R., Rakhmawati, N. A., Informasi, S., Elektro, F. T., & Kunci, K. (2024). Faktor Pengaruh Generative Ai Terhadap Kemampuan Berpikir Kritis Mahasiswa ITS Surabaya. *Jurnal Sistem Informasi Dan Aplikasi,* 3(3).

Riyanto, A. (2022). Aplikasi Metodologi Penelitian Kesehatan. Yogyakarta: Nuha Medika.

Sari, D. K., & Rosana, D. (2024). Artificial Intelligence Literacy in Indonesian Higher Education. *Journal of Educational Research and Evaluation, 8*(1), 23–35.

Sari, D. K., Supahar, S., Rosana, D., Dinata, P. A. C., & Istiqlal, M. (2025). Measuring Artificial Intelligence Literacy: The Perspective of Indonesian Higher Education Students. *Journal of Pedagogical Research, 9*(2), 143-157. https://doi.org/10.33902/JPR.202531879

Shah, D. S. M., Ahmad, E. A., Tahir, M. H. M., Othman, S., & Darazi, M. A. (2025). Perceived Impact of ChatGPT on Academic Engagement and Creative Self-Efficacy in Higher Education. *International Journal of Advanced Research in Education and Society, 7*(5), 140–153. https://doi.org/10.55057/ijares.2025.7.5.13

Sukma, A. A., & Hikmawan, R. (2026). Development and Effectiveness of an Interactive Prompt Engineering E-module to Enhance Vocational Students' Learning Outcomes. *Journal of Educational Sciences, 10*(3), 772–790. https://doi.org/10.31258/jes.10.3.p.772-790

Tang, J., Huang, P., & Yan, S. (2025). Digital Transformation in Higher Education: Logical Framework, Practical Dilemmas, and Implementation Approaches. *Frontiers in Psychology*, 16, 1565591. https://doi.org/10.3389/fpsyg.2025.1565591

Vieriu, A. M., & Petrea, G. (2025). The Impact of Artificial Intelligence (AI) on Students' Academic Development. *Education Sciences, 15*(3), 343. https://doi.org/10.3390/educsci15030343

Walter, Y. (2024). Embracing the Future of Artificial Intelligence in the Classroom: The Relevance of AI Literacy, Prompt Engineering, and Critical Thinking in Modern Education. *International Journal of Educational Technology in Higher Education, 21*(15). https://doi.org/10.1186/s41239-024-00448-3

Waziana, W. , Andewi, W. , Wibisono, D. , Hastomo, T. and Muslihudin, M. (2025). Exploring ChatGPT's Impact on Critical, Creative, and Reflective Thinking Skills: A Mixed-Methods Study in an Indonesian EFL Classroom. *Applied Research on English Language, 14*(4), 77-114.

Woo, D. J., Wang, D., Yung, T., & Guo, K. (2024). Effects of a Prompt Engineering Intervention on Undergraduate Students' AI Self-Efficacy, AI Knowledge, and Prompt Engineering Ability: A Mixed Methods Study. arXiv Preprint. https://doi.org/10.48550/arXiv.2408.07302

Yim, I. H. Y. (2024). A Critical Review of Teaching and Learning Artificial Intelligence (AI) Literacy: Developing an Intelligence-based AI Literacy Framework for Primary School Education. *Computers and Education:*

Artificial Intelligence, 7, 100319. https://doi.org/10.1016/j.caeai.2024.100319

Yusriani, & Fithriani, R. (2025). Exploring English Language Learning via ChatGPT: A Case Study from a Self-determination Theory Perspective. *Journal of Educational Sciences, 9*(4), 3064–3076. https://doi.org/10.31258/jes.9.4.p.3064-3076

Yusuf, A., Pervin, N., & Román-González, M. (2024). Generative AI and the Future of Higher Education: A Threat to Academic Integrity or Reformation? Evidence from Multicultural Perspectives. *International Journal of Educational Technology in Higher Education, 21*(21). https://doi.org/10.1186/s41239-024-00453-6

Zhai, C., Wibowo, S., & Li, L. D. (2024). The Effects of Over-reliance on AI Dialogue Systems on Students' Cognitive Abilities: A Systematic Review. *Smart Learning Environments*, 11, 28. https://doi.org/10.1186/s40561-024-00316-7

Zhai, J., & Zhang, H. (2023). Critical Thinking Disposition of Medical Students in Anhui Province, China: A Cross-sectional Investigation. *BMC Medical Education*, *23*(1). https://doi.org/10.1186/s12909-023-04646-x

How to cite this article:

Hanifatunnisa, F. A., & Septiadi, J. (2026). The Simultaneous Influence of AI Literacy and Prompting Skills on Students' Critical Thinking Disposition. *Journal of Educational Sciences*, *10(5)*, 112-125.