Journal of Education and Teaching Learning (JETL)
Volume 8, Issue 1, January 2026
Journal Homepage:
http://pusdikra-publishing.com/index.php/jetl

The Double-Edged Impact of Artificial Intelligence on Students' Critical Thinking Skills in Indonesia: A Systematic Literature Review

Putu Andre Wiranatha[1], Ni Wayan Surya Mahayanti[2], Ni Luh Putu Era Adnyayanti[3]
[1,2,3] *Universitas Pendidikan Ganesha, Singaraja, Indonesia*
Corresponding Author : andre@student.undiksha.ac.id

ARTICLE INFO
Article history:
Received
18 January 2026
Revised
28 February 2025
Accepted
30 March 2026

ABSTRACT

Nowadays Artificial Intelligence (AI) has become an inseparable part of the world of education. AI in education has become so commonplace that its impact is still being researched. A crucial area of research is how AI impacts students' cognitive abilities. Therefore, it's really important to examine the impact on AI on the students critical thinking skill. This study aims to examine the positive and negative impact of AI on students critical thinking in Indonesia. This critical thinking aspect including interpretation, analysis, evaluation, inference, synthesize explanation, and self-regulation. Using systematic literature review method with PRISMA model. several criteria were added during literature selection such as 1) The Research on the use of AI among student, 2) Students' critical thinking in the AI era, 3) Students in Indonesia, 4) published between 2019-2025. There are 136 studies as a database and 17 has been reviewed. The results of this study found that AI both have positive and negative impact on students critical thinking skills. But negatively impacts almost all dimensions of critical thinking, especially Interpretation, analysis, evaluation, inference, self-regulation, and explanation. Therefore, for future research should examine the long-term effects of AI integration on students' cognitive development to better understand its lasting impact.

Key Word *Artificial Intelligence, Critical Thinking, Educational Technology.*
How to cite https://pusdikra-publishing.com/index.php/jetl

INTRODUCTION

The rapid advancement of artificial intelligence (AI) has brought about major changes in various fields, especially education. AI is changing the way students' access and use reading materials through chatbots, customized learning platforms, and recommendation algorithms (Abdallah et al., 2024; Fitria, 2021). This makes students no longer rely solely on printed books but more often use digital platforms. In Indonesia, the increase in digital literacy has made students more familiar with technology so that their reading habits have changed (Wiranatha & Santosa, 2024). This change begs a series of questions about the sustainability of deep reading and the implication of deep

reading on cognitive development, critical thinking, and academic success (Gonsalves, 2024). It is, therefore, urgent to understand the impact of artificial intelligence (AI) on reading behaviors which, in their turn, impact the ability of Indonesian students to think critically.

Among the benefits of AI, it provides the ability to access information more easily and understand it better thanks to artificial intelligence features, including summarization and automatic translation (Dewi et al., 2024; Hidayat, 2024). However, the fact that concise summaries and visual materials are being relied on at the cost of multi-page, multi-layers reading can create issues (Sari et al., 2023). This reliance concerns the loss of good thinking ability and the inability to distinguish between reliable information and falsehoods (Cahyani et al., 2024; Çela et al., 2024). Without proper digital literacy, the ease provided by AI will involuntarily stimulate cognitive reliance and reduce the analytical efficiency.

Access to and choice of reading materials has also changed with the introduction of AI among students (Ulfah & Hina, 2025). With the help of AI-based recommendation systems and smart learning systems, students can now access texts in their desired fields and at their levels of proficiency without having to do a search (Ihsani et al., 2024). Some of the instructional methods that may improve critical thinking are technology-based (Merta et al., 2023). On the other hand, there are the problems of the transition to digital media, one of which is the decline in popularity of long or scientific literature (Sari et al., 2023). Therefore, many students now prefer short articles, instant summaries, or visual-based content. This pattern shows that AI is not only making it easier to access reading materials, but also indirectly directing the types of reading materials that students consume.

There are several potential impacts of using AI in learning. AI has a positive impact on improving reading habits. Technologies such as text-to-speech, automatic translation, and summary features help students understand difficult reading more easily (Dewi et al., 2024; Fitria, 2021; Omolu & Mappewali, 2024; Yuxiu, 2024). During reading activities, AI can also quickly improve comprehension of academic content and encourage students to learn independently (Hidayat, 2024). Several educational programs and media have applied AI in provision of adaptive and interactive materials (Ratminingsih & Budasi, 2020). These attempts show that AI can help instill the reading culture, especially in those students who were not interested in large quantities of texts. Based on this, the strategic introduction of AI into pedagogy is justified in order to enhance the level of digital literacy and critical thinking.

Despite this, the effects of AI are not entirely good. The reliance on AI by students in fast access to information may reduce their ability to read critically and deeply (Çela et al., 2024). It has been associated with poorer retention and reduced ability to analyze complex texts because of the preference that to be provided with instantaneous summaries rather than more detailed texts (Cahyani et al., 2024; Hukom & Ferdinandus, 2024). Also, the omnipresence of digital media changes the reading patterns, where the number of books that are read entirely is decreased (Baba & Affendi, 2020). In the absence of a high level of digital literacy, the application of AI can further the intellectual laziness and hinder the students in their capacity to analyze the correct and not-correct information.

The current research paper is based on the critical thinking framework developed by Facione (1990) and assumes that critical thinking involves the skill of asking or providing insightful questions in a constructive way to attain overall knowledge. The ability is inclusive of interpretation, analysis, evaluation, inference, synthesis, explanation and self-regulation. When considering the framework in the context of this systematic literature review, it offers a basis to analyze, classify, and spread the findings about critical thinking skills. Using the elements of Facione, the synthesis may become more focused, and the comprehensive understanding of how critical thinking is conceptualized, measured, and developed may be obtained in terms of the previous research.

In general, the incorporation of AI into the reading pattern of Indonesians has its opportunities and difficulties that should be explored. Artificial intelligence has the capability to make knowledge democratic, deepen content understanding and provoke autonomous research. On the other hand, its unregulated use can hinder the in-depth knowledge, critical thinking, and long-term readings of more complicated literary works that are expected of students. This systematic literature review (SLR) research helps us better understand how AI impacts the way Indonesian students read and develop their critical thinking skills. This is a crucial step in creating future teaching methods, developing curricula, and digital literacy programs. Therefore, a deep understanding of this relationship is necessary for effective use of AI to truly enhance, rather than diminish, cognitive abilities and critical thinking skills, which are vital for learning in the digital age.

RESEARCH METHOD

This study was a systematic literature review (SLR). This type of research is used to define, evaluate, and interpret related research findings to achieve the objectives of this research. The data and information for this research were collected from journals and articles in google scholar published in 2019-2025, the reason choose those years because in 2019 there is a beginning of the students in Indonesia using AI as their assistance to help until 2025 is the massive use of AI among Students, therefore we wanted to research the phenomena that occurred during that period. In this study, the researcher began by searching related papers by using the keywords 'AI,' 'critical thinking,' 'Indonesia,' and 'students in Indonesia,'. All the sources for this study were collected and selected. That action aims to determine whether the sources are suitable for this present study.

The method used is the PRISMA method. Preferred Reporting Items for Systematic and Meta-Analytic (PRISMA) was used to select, review, and summarize based on objectives, year of publication, instruments, methods, and results for future research. The inclusion of this study includes 1) research on the use of AI among students, 2) Students' critical thinking in the AI era, 3) students In Indonesia, 4) published between 2019-2025. Contrarily, the exclusion criteria include: 1) the research is not about the use of AI among students, 2) not about students critical thinking in AI era, 3) not in Indonesia, 4) published under the year of 2019. The table shows in Table 01.

Electronic searches of several prestigious academic databases, such as Google Scholar, ERIC, Scopus, and ResearchGate, were used to gather the data for this review. To make sure that the inclusion of local research Sinta journals indexed is including for search the article based in Indonesia. Around 136 studies were gathered after using the PRISMA model. Around 17 studies were selected and chosen based on the inclusion criteria. The data shows in Figure 1.

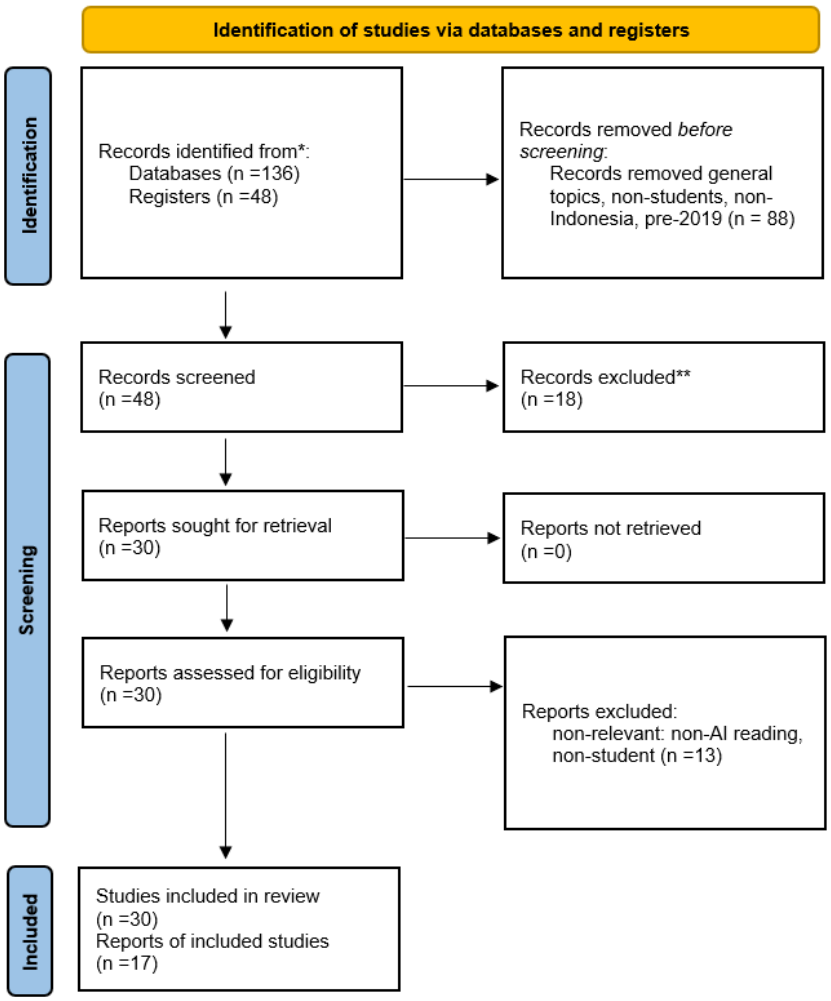

Figure 1.
The Prisma Model

The article was chosen have some criteria. The inclusion of this study includes 1) The Research on the use of AI among student, 2) Students' critical thinking in the AI era, 3) Students in Indonesia, 4) published between 2019-2025. Contrarily, the exclusion criteria include: 1) The Research Is Not About the use of AI among students, 2) Not About Students' critical thinking in the AI era, 3) Not in Indonesia, 4) Published under the year of 2019. The table shows in Table 1.

Table 1.
Criteria Table

INCLUSION	EXCLUSION
The research on the use of AI among students	The research is not about the use of AI among students
Students' critical thinking in the AI era	Not about students' critical thinking in the AI era
Students in Indonesia	Not in Indonesia
Published between 2019-2025	Published under 2019

RESULT AND DISCUSSION

The selected articles present a patterned synthesis of how Artificial Intelligence (AI) affects students' critical thinking skills within the Indonesian educational context. The studies examined here, rather than presenting disparate or unconnected results, consistently demonstrate that artificial intelligence serves as both a cognitive aid and a potential source of risk, contingent upon its application. Conversely, a substantial volume of research suggests that the integration of artificial intelligence within educational contexts fosters positive effects on students' cognitive development. These advantageous impacts manifest in various ways, such as the cultivation of critical thinking capabilities, a deeper understanding of instructional content, heightened learning efficiency, and the fortification of students' analytical proficiencies. Specifically, AI-supported learning environments seem to offer structured support, facilitating students' ability to deconstruct intricate problems, assess information more methodically, and formulate more substantiated arguments.

Furthermore, the results indicate that artificial intelligence significantly affects how students think. By offering immediate feedback, facilitating guided responses, and delivering content adaptively, AI allows students to interact with educational resources in a more dynamic and responsive way. This approach not only aids in the acquisition of knowledge but also prompts students to contemplate their reasoning, a fundamental element of critical thinking. Several investigations have shown that students exhibited enhanced capabilities in questioning information, contrasting differing viewpoints, and substantiating their responses, thereby suggesting that AI can serve as a catalyst for more profound cognitive engagement when employed judiciously.

Conversely, the findings also suggest that the influence of artificial intelligence is not consistently beneficial in every setting. Several investigations underscore the growing apprehensions surrounding students' overreliance on AI technologies. When students become overly reliant on AI-generated material, their ability to think independently could be compromised. This situation might lead to a superficial understanding of the material, as students may focus on obtaining correct answers rather than developing the fundamental reasoning skills. Moreover, there are documented concerns about reduced originality and academic integrity, particularly when students employ AI without critical evaluation or personal input.

A further significant trend emerging from the research indicates that the efficacy of artificial intelligence is intimately connected to its integration within the educational framework. Studies that integrate artificial intelligence into structured teaching methods, such as inquiry-based or problem-based learning

approaches, typically show more significant improvements in critical thinking abilities compared to those that use AI as a standalone tool. This suggests that AI does not, by itself, cultivate critical thinking; rather, it enhances the learning framework within which it is incorporated. Overall, these results suggest that AI has a dual role in education: as an enabler of higher-order thinking and as a potential source of cognitive dependency. Therefore, implementing this requires careful regulation and teaching methods that keep students actively involved in the thinking process. A more detailed classification of these findings is presented in Table 2, which summarizes the research purposes, identified effects, and key results of each selected study.

Table 2.
The Results of Related Study

Author & Year	Research Purposes	Effect	Results
(Baskoro et al., 2023)	Improving Generation Z Critical Thinking Skills using Pedagogy as a Learning Approach and Artificial Intelligence (AI) as a Tool	Both	AI effective in improving critical thinking skills especially in back-end learning (verification & validation). But uncontrolled AI use reduces exploration and creativity
(Harmilawati et al., 2024)	The aim of this research is to explore the influence of AI on the development of students' critical thinking skills from an epistemological perspective.	Both	This study shows that AI can help improve EFL students' critical thinking skills, but it also poses risks such as technology dependency, varying information quality, social isolation, and ethical issues. Therefore, the use of AI must be balanced between its benefits and risks.
(Julianti et al., 2025)	To analyze the challenges as well as the positive and negative impacts of AI integration on students' critical thinking abilities.	Both	AI supports personalized, interactive learning and analytical skills. The challenges include dependency, plagiarism, digital literacy gaps, access inequality, ethical issues.
(Akastangga	Analyze the impact of	Positive	ChatGPT is quite

Author & Year	Research Purposes	Effect	Results
et al., 2023)	Chat GPT on students critical thinking.		influential in improving critical thinking skills. 5 of the critical thinking skills components are good but in evaluation skills is Average
(Darwin et al., 2024)	This study examines how students learning English as a foreign language view the good and bad sides of Artificial Intelligence (AI) in terms of critical thinking.	Positive	The study states that AI can help improve critical thinking skills in English language learners, but it must be used with caution.
(Ayuningtyas et al., 2024)	This study aims to analyze the influence of the use of Artificial Intelligence (AI) on students' critical thinking skills in the Educational Technology study program.	Positive	The use of AI among Educational Technology has a significant influence on their critical thinking skills. Students use AI for analysis, comparison, synthesis. But the AI risk of dependency
(Harahap, 2024)	This study aims to determine how the use of ChatGPT can improve students' critical thinking skills.	Positive	The results of this study indicate that ChatGPT can improve students' critical thinking skills if used actively and reflectively, not just by copying raw results.
(Mayasari et al., 2024)	This study investigates the effectiveness of using artificial intelligence (AI) learning tools and customized curriculum in improving students' critical thinking skills in Indonesia.	Positive	The findings of this study provide strong evidence that the use of AI learning tools and customized curriculum significantly improves critical thinking skills among students in Indonesia.
(Rahmanto et al., 2024)	The purpose of this study is to determine the effect of the use of Artificial Intelligence on critical thinking skills in	Positive	The results of the study show that AI has significant potential in facilitating learning and strengthening students'

Author & Year	Research Purposes	Effect	Results
	education.		critical thinking. AI technology can be applied in problem-based learning and foster critical thinking.
(Hutapea et al., 2025)	This study investigates the role of AI applications in supporting students' understanding of complex academic texts.	Positive	This study shows that AI applications have significant potential to improve students' learning efficiency and comprehension of academic reading. AI not only improves reading comprehension but also accelerates reading, encourages critical thinking, and enriches vocabulary.
(Sugihyono, 2025)	This research was conducted to examine AI technology in education and its impact on Generation Alpha in the era of technological development.	Negative	AI improves learning access, motivation, and efficiency, but reduces critical thinking, increases dependency, promotes instant problem-solving, decreases literacy habits, and triggers moral/social issues. Students rely on AI for answers, causing reasoning and CT decline.
(Cahyani et al., 2024)	Examine the impact of artificial intelligence (AI) on critical reading skills of university students.	Negative	AI negatively impacts students' critical reading skills, particularly in interpretation, analysis, evaluation, inference, explanation, and self-regulation.
(Nafil et al., 2024)	This study aims to analyze the impact of using AI on students' critical thinking skills.	Negative	The findings suggest that AI helps students learn faster and access more information. However, relying too much on AI can make students less

Author & Year	Research Purposes	Effect	Results
			independent and damage their critical thinking.
(Octaberlina et al., 2024)	This research examines how AI impacts academic writing, particularly critical thinking, originality of work, honesty in research, and the risk that relying too much on AI will stop people from improving their own thinking skills.	Negative	The study found that AI can reduce individuals' critical thinking skills and creativity, reduce the originality of work, encourage plagiarism, undermine academic integrity, and hinder the development of independent thinking skills due to reliance on this technology.
(Silalahi et al., 2024)	This study aims to analyze the impact of introducing AI in education.	Negative	The study found that AI makes it easier for students to access learning materials. However, relying too much on AI can reduce students' critical thinking skills because they rely too much on technology.
(Siregar et al., 2024)	This article aims to find student references regarding the use of Artificial Intelligence.	Negative	The results of this study show that artificial intelligence (AI) can help students in learning process. However, AI also makes students more dependent and reduces their critical thinking skills and memory.
(Cholvistaria & Gunawan, 2025)	This study aims to determine how AI can influence the process of developing critical thinking among students and how higher education can optimize the use of AI to support, not replace, their critical thinking skills.	Negative	Research findings shows that while AI can enrich the learning process and facilitate data-driven decision-making, students need to be given special attention to avoid relying entirely on this technology to develop critical thinking skills.

The table above summarizes the findings of a Systematic Literature Review (SLR) that examines various studies on how Artificial Intelligence (AI) affects students' critical thinking skills (Table 2). The table organizes the research findings into four main categories: the author and publication year, the research goals, the observed effects, and the resulting outcomes. This structure allows for a thorough examination of the main trends, key areas of focus, and the level of agreement among the findings in this field. An analysis of the stated research objectives shows that most studies focus on investigating the impact of integrating AI into education. This includes intelligent tutoring systems, chatbots, and adaptive learning platforms, with a particular emphasis on their ability to develop higher-order thinking skills, especially critical thinking. Therefore, this highlights the tendency to view artificial intelligence not just as a technological tool, but also as a teaching method designed to encourage more complex thinking.

Therefore, most of the studies reviewed suggest that using artificial intelligence has positive effects on students' critical thinking skills. As a result, students show improvements in their ability to analyze information in depth, evaluate arguments, and create more logical, evidence-based conclusions. However, some research also shows that these outcomes are not guaranteed or always seen. The effectiveness of AI greatly depends on how the technology is used in the learning environment, including the teaching methods used and the teacher's role in guiding students. in this regard, AI utilized without a suitable pedagogical framework tends to operate merely as an informational resource, rather than as a mechanism for the optimal cultivation of critical thinking skills.

The results largely support the idea that artificial intelligence helps students think more deeply, which in turn encourages the development of more advanced thinking skills. However, the research findings vary, particularly regarding how strong this influence is and the specific situations in which it occurs. Several studies reported less than optimal results, generally due to limitations in research design, a lack of pedagogical interventions, or students' low readiness to utilize AI technology effectively. This difference suggests that while artificial intelligence has significant potential, its implementation still faces challenges that require further study.

The data in the table 2 suggests that using artificial intelligence in education could significantly improve students' critical thinking skills. Nevertheless, the inconsistent results also underscore a deficiency in the existing research, specifically concerning the optimization of AI-driven learning designs to achieve reliable and enduring effects. Consequently, subsequent investigations should prioritize the integration of AI technologies with suitable

pedagogical strategies, while also accounting for contextual variables that could affect its efficacy in cultivating students' critical thinking skills.

Disscussion

The impact of AI on students' critical thinking skills in Indonesia is both beneficial and detrimental. A study by Baskoro et al. (2023), showed that AI effectively improves critical thinking skills among Generation Z, especially during the back-end learning process. AI can significantly improve critical thinking skills, especially when used actively, reflectively, and within a structured educational framework (Akastangga et al., 2023; Darwin et al., 2024; Harahap, 2024; Julianti et al., 2025; Nafil et al., 2024). AI can also help students understand difficult material, analyze information, compare arguments, and reach logical conclusions (Ayuningtyas et al., 2024; Cholvistaria & Gunawan, 2025; Harahap, 2024; Julianti et al., 2025; Nafil et al., 2024; Santosa et al., 2024; Silalahi et al., 2024; Sugihyono, 2025). The positive effect of AI on critical thinking is related to interpretation, analysis, evaluation, and inference. Nevertheless, explanatory dimensions and self-regulation are unclear.

There are many positive educational opportunities of artificial intelligence, but there are also negative consequences, which should be monitored, especially in the context of their excessive or abusive use. Excessive use of AI may lead to the loss of critical and creative thinking and the creation of lazy learners who cannot analyze something before giving answers and an interpretation of their personal views (Akastangga et al., 2023; Cahyani et al., 2024; Cholvistaria & Gunawan, 2025; Nafil et al., 2024; Silalahi et al., 2024; Siregar et al., 2024). This content erosion pollutes original thinking, erodes creativity, condones plagiarism, and undermines academic integrity (Harmilawati et al., 2024; Octaberlina et al., 2024). By using AI in home assignments without critical thinking, learners miss learning as they have to work on analytical skills and learn more (Harahap, 2024). As a result, extensive AI consumption could also reduce all aspects of critical thought, in particular interpretation, analysis, evaluation, inference, and self-regulation, and indirectly affect explanatory competence.

The possible impact of AI on education is hard to overestimate; however, some concerns should be raised. Among the most crucial issues is the fact that AI should not replace the teacher as an agent of learning (Fitria, 2023). Instead, AI is supposed to serve as a supplement to the teaching-learning process (Juniantini et al., 2024). AI can help teachers to find new instructional strategies, work on pedagogical strategies, develop efficient tests, and improve the teaching of the language (Kusuma et al., 2024). The teachers will continue to play the crucial role of building emotional ties, characterisation, and critical

thinking in a manner that cannot be replicated by robots (Hossain et al., 2025). However, AI can also assist instructors to correct mistakes (Utami & Mahardika, 2023). Other issues relate to the disparities in the readiness of the technical infrastructure in Indonesia, especially in regions with a low internet connection or the digital equipment (Purnama et al., 2025). Additionally, not all teachers are currently ready to educate using technology-based literacy (Padmadewi et al., 2023). This unequal accessibility can further contribute to the difference in the quality of education between an urban and a rural student.

The other equally critical issue is on how to develop an educational system that can integrate artificial intelligence (AI) both in an ethical and responsible manner. The curriculum should be modified in a way that would utilize AI technologies in a way that would encourage creativity, analytical thinking, and decision-making that is based on data without compromising the principles of academic dishonesty and intellectual independence. Moreover, educators need to be trained to learn more about how AI systems work and how they affect the learning process of students (Tan et al., 2025). One of the most important questions is the safety of personal information of students, as the work of most AI applications is based on the gathering of user data (Huang, 2023). Without the strong regulatory frameworks and data-protection systems, the threat of data misuse and breach of privacy may be a severe problem. The policy preparedness, digital literacy, and cooperation between government agencies, schools, teachers, and the general community will, therefore, be critical in the future of successful integration of AI in education by creating an ecosystem of adaptive, safe, and whole-person-centered learning.

CONCLUSION

The results of this study suggest that artificial intelligence (AI) has both beneficial and adverse effects on the critical thinking abilities of the students in Indonesia. It has been demonstrated that the utilization of AI can positively influence the students in their understanding of difficult material, development of analytical thinking, and promotion of logical and reflective decision makers. However, all these positive consequences all depend on how AI is utilized as part of the educational process. The entire benefits of AI can be achieved only when it is used in a strictly controlled way and tutored by teachers. On the other hand, overdependence on AI can trigger the deterioration of student's cognition and critical thinking. Additionally, AI may reduce academic imagination and honesty among students since it promotes plagiarism.

Moreover, the urgent focus should be made to solve the persisting issues related to the use of artificial intelligence in the educational sphere, including

the need to provide training to instructional employees, the presence of regional inequality in access, and the security of personal information of students. To promote efficient and responsible use of AI, a design of an all-inclusive, multistakeholder implementation framework is necessary. Artificial intelligence is not only a technological resource but it is also a manifestation of education change, thus, imparting the 21st -century learners with the much-needed competencies, especially in critical thinking, which is expected to become a necessity in the future.

The next step that must be taken in future studies is to explore the longitudinal impacts of AI integration on the learners critical thinking abilities to have a better perspective of the technology impact on the cognitive development at both temporal scales. Overall, the objectives of this study have been achieved by clarifying the dual impacts of AI on students' critical thinking skills and identifying key educational implications for effective and responsible integration of AI in education in Indonesia.

REFERENCES

Abdallah, A. K., Alkaabi, A. M., Mehiar, D. A. F., & Aradat, Z. A. J. (2024). Chatbots in classrooms: Tailoring education and boosting engagement. In A. K. Abdallah, A. M. Alkaabi, & R. Al-Riyami (Eds.), *Advances in Educational Technologies and Instructional Design* (pp. 166–181). IGI Global. https://doi.org/10.4018/979-8-3693-0880-6.ch012

Akastangga, M. D. F., Harmonis, S., & Hafidz, R. A. A. (2023). The impact of ChatGPT on the critical thinking ability of UIN Sunan Kalijaga students. *MATRIX : Jurnal Manajemen Teknologi Dan Informatika*, *13*(3), 157–165. https://doi.org/10.31940/matrix.v13i3.157-165

Ayuningtyas, G. F., Fahranie, H. K., Muslimah, I., Hadiansyah, S., Elzahra, S., & Setiawan, B. (2024). Pengaruh penggunaan AI terhadap peningkatan critical thinking mahasiswa teknologi pendidikan. *Action Research Journal Indonesia (ARJI)*, *6*(4), 405–416. https://doi.org/10.61227/arji.v6i4.234

Baba, J., & Affendi, F. R. (2020). Reading habit and students' attitudes towards reading: A study of students in the faculty of education UITM puncak alam. *Asian Journal of University Education*, *16*(1), 109–122. https://doi.org/10.24191/ajue.v16i1.8988

Baskoro, G., Mariza, I., & Sutapa, I. N. (2023). Innovation to Improve Critical Thinking Skills in the generation Z using peeragogy as a learning approach and Artificial Intelligence (AI) as a tool. *Jurnal Teknik Industri*, *25*(2), 121–130. https://doi.org/10.9744/jti.25.2.121-130

Cahyani, R. Y. D., Dewi, O. C., & Darmawan, A. (2024). AI and critical reading skill among university students (the impact of artificial intelligence (AI) on Al-ghifari university students' critical reading skills). *The GIST*, *6*(1), 64–71. https://doi.org/10.53675/gist.v6i1.1374

Çela, E., Fonkam, M. M., & Potluri, R. M. (2024). Risks of AI-assisted learning on student critical thinking: A case study of Albania. *International Journal of Risk and Contingency Management*, *12*(1), 1–19. https://doi.org/10.4018/IJRCM.350185

Cholvistaria, M., & Gunawan, A. (2025). Pengaruh artificial intelligence (AI) terhadap berpikir kritis Mahasiswa. *POACE: Jurnal Program Studi Adminitrasi Pendidikan*, *5*(1), 1–8. https://doi.org/10.24127/poace.v5i1.8155

Darwin, Rusdin, D., Mukminatien, N., Suryati, N., Laksmi, E. D., & Marzuki. (2024). Critical thinking in the AI era: An exploration of EFL students' perceptions, benefits, and limitations. *Cogent Education*, *11*(1), 1–18. https://doi.org/10.1080/2331186X.2023.2290342

Dewi, N. P. E. C., Ratminingsih, N. M., & Santosa, M. H. (2024). Improving sixth grade students' language literacy by utilizing digital multilingual thematic dictionary. *Jurnal JOEPALLT (Journal of English Pedagogy, Linguistics, Literature, and Teaching)*, *12*(2), 277–292. https://doi.org/10.35194/jj.v12i2.4645

Facione, P. A. (1990). *Critical thinking: A statement of expert consensus for purposes of educational assessment and instruction*. CA: California Academic Press.

Fitria, T. N. (2021). Artificial intelligence (AI) in education: Using AI tools for teaching and learning process. *Proceeding Seminar Nasional & Call For Papers*, 134–147.

Fitria, T. N. (2023). The use of artificial intelligence in education (AIED): Can AI replace the teacher's role? *EPIGRAM (e-Journal)*, *20*(2), 165–187. https://doi.org/10.32722/epi.v20i2.5711

Gonsalves, C. (2024). Generative AI's impact on critical thinking: Revisiting bloom's taxonomy. *Journal of Marketing Education*, 1–16. https://doi.org/10.1177/02734753241305980

Grow, G. (1996). Cognitive reading theory and its implications for the Teaching of writing. *Serving the Strategic Reader*. https://files.eric.ed.gov/fulltext/ED406644.pdf

Harahap, D. S. (2024). Implementation of ChatGPT to improve students' critical thinking abilities. *Indonesian Journal of Education and Social Humanities*, *1*(2), 33–39. https://doi.org/10.62945/ijesh.v1i2.58

Harmilawati, Rifqatussa'diyah, Amalia, P., Majid, H. A., & Sahrah, I. A. (2024). Peran teknologi AI dalam pengembangan kemampuan berpikir kritis mahasiswa. *Prosiding Seminar Nasional Fakultas Tarbiyah dan Ilmu Keguruan IAIM Sinjai*, *3*, 26–31. https://doi.org/10.47435/sentikjar.v3i0.3134

Hidayat, M. T. (2024). Effectiveness of AI-based personalised reading platforms in enhancing reading comprehension. *Journal of Learning for Development*, *11*(1), 115–125. https://doi.org/10.56059/jl4d.v11i1.955

Hossain, A., Ansari, S. H., Sarkar, R., & Bhattacharjee, S. (2025). The Role Of Teacher-Student Relationships In Promoting Emotional Well-Being In Primary Schools In West Bengal. *IOSR Journal Of Humanities And Social Science (IOSR-JHSS)*, *30*(1), 50–56. https://doi.org/10.9790/0837-3001065056

Huang, L. (2023). Ethics of Artificial Intelligence in Education: Student Privacy and Data Protection. *Science Insights Education Frontiers*, *16*(2), 2577–2587. https://doi.org/10.15354/sief.23.re202

Hukom, S. J., & Ferdinandus, M. S. (2024). The effectiveness of implementing summary writing to improve students' reading comprehension. *PEDAGOGIKA: Jurnal Pedagogik Dan Dinamika Pendidikan*, *12*(1), 66–74. https://doi.org/10.30598/pedagogikavol12issue1page66-74

Hutapea, E., Hutabalian, R., & Hartati, R. (2025). Summarizing AI application on student learning efficiency in understanding academic reading materials. *Indonesian Journal of Education and Development Research*, *3*(1), 737–745. https://doi.org/10.57235/ijedr.v3i1.4878

Ihsani, L. M. A. F., Hasani, M. T., Akma, M. A. F., Jupilatun, & Jaelani, S. R. (2024). Exploring the impact of technology in enhancing English reading skill. *Pendekar :Jurnal Pendidikan Berkarakter*, *1*(4), 266–276. https://doi.org/10.51903/pendekar.v1i4.338

Julianti, A., Pratama, O. S., & Rachman, I. F. (2025). *Analisis tantangan dan dampak AI terhadap kemampuan berpikir kritis siswa sekolah menengah pertama*. *2*(5), 543–553. https://doi.org/10.62017/merdeka

Juniantini, L. A., Santosa, M. H., & Kusuma, I. P. I. (2024). Enacting an artificial intelligence-based learning media to support vocabulary mastery at SMA negeri 2 Gerokgak: A mixed methods study. *Jurnal JOEPALLT (Journal of English Pedagogy, Linguistics, Literature, and Teaching)*, *12*(1), 1–15. https://doi.org/10.35194/jj.v12i1.3398

Kusuma, I. P. I., Roni, M., Dewi, K. S., & Mahendrayana, G. (2024). Revealing the potential of ChatGPT for English language teaching: EFL preservice teachers' teaching practicum experience. *Studies in English Language and Education*, *11*(2), 650–670. https://doi.org/10.24815/siele.v11i2.34748

Mayasari, N., Sastraatmadja, A. H. M., Suparman, T., Mutiara, I. I., & Maqfirah, P. A.-V. (2024). Effectiveness of using artificial intelligence learning tools and customized curriculum on improving students' critical thinking skills in Indonesia. *The Eastasouth Journal of Learning and Educations*, *2*(02), 111–118. https://doi.org/10.58812/esle.v2i02.302

Merta, L. W. S., Ratminingsih, N. M., & Budasi, I. G. (2023). The integration of technology in English language teaching to stimulate students' critical thinking. *Language Circle: Journal of Language and Literature*, *17*(2), 333–341. https://doi.org/10.15294/lc.v17i2.39097

Nafil, A. A., Jatmiko, F., Saputra, R. W., & Parhusip, J. (2024). Distribusi rata-rata pengaruh artificial intelligence terhadap kemampuan berpikir kritis mahasiswa. *JURNAL TEKNIK INFORMATIKA DAN MULTIMEDIA*, *4*(2), 46–51.

Octaberlina, L. R., Muslimin, A. I., Chamidah, D., Surur, M., & Mustikawan, A. (2024). Exploring the impact of AI threats on originality and critical thinking in academic writing. *Edelweiss Applied Science and Technology*, *8*(6), 8805–8814. https://doi.org/10.55214/25768484.v8i6.3878

Omolu, F. A., & Mappewali, A. (2024). The impact of translation tools towards student translators' skills. *Premise: Journal of English Education*, *13*(1), 340–367. https://doi.org/10.24127/pj.v13i1.8731

Padmadewi, N. N., Artini, L. P., Ratminingsih, N. M., & Trika Adi Ana, I. K. (2023). Elementary school teachers' readiness in teaching technology-based literacy. *International Journal of Elementary Education*, *7*(2), 299–310. https://doi.org/10.23887/ijee.v7i2.61675

Purnama, M. R., Adnyana, I. P. I. K., Sogen, A. T. L., Indrawan, G., & Santosa, M. H. (2025). Teacher's readiness toward artificial intelligence in the school of north Bali. *Jurnal Paedagogy*, *12*(1), 23–32. https://doi.org/10.33394/jp.v12i1.13707

Rahmanto, A. A., Arum, M., Rahmawati, D. R., Cynthia, V., & Ramadhan, G. (2024). *Artificial intelligence dan critical thinking: Systematic literature review*. *9*(3), 242–251.

Ratminingsih, N. M., & Budasi, I. G. (2020). Printed media versus digital media: Which one is more effective? *Proceedings of the 3rd International Conference on Innovative Research Across Disciplines (ICIRAD 2019)*, *394*, 49--55. https://doi.org/10.2991/assehr.k.200115.009

Santosa, M. H., Trisna Yanti, G. A. M., & Adnyani, L. D. S. (2024). The integration of google translate as a machine translation aid in EFL students' thesis composition. *LLT Journal: A Journal on Language and Language Teaching*, *27*(1), 214–229. https://doi.org/10.24071/llt.v27i1.3734

Sari, I. P., Karina, J., Angraini, J. R., & Badriyah, L. (2023). Effect of gadgets on the development of interest in reading. *International Journal of Education and Teaching Zone*, *2*(1), 156–169. https://doi.org/10.57092/ijetz.v2i1.109

Silalahi, A. J., Aisyah, S., & Handayani, M. (2024). The effect of artificial intelligence on student reading interest in Indonesian history lessons at SMA ST. Antonius Medan. *International Journal of Information System & Technology*, *8*(4), 218–225. https://doi.org/10.30645/ijistech.v8i4.365.

Siregar, R., Subagiharti, H., Handayani, D. S., Sutarno, S., Hasibuan, A. L., & Barus, E. (2024). Student preferences on using artificial intelligence (AI) platform in language learning. *International Journal of Educational Research Excellence (IJERE)*, *3*(2), 746–754. https://doi.org/10.55299/ijere.v3i2.890

Sugihyono. (2025). The dark side of AI in Indonesian education: Understanding its impact on the alpha generation in the era of technological development. *LITERACY : International Scientific Journals of Social, Education, Humanities*, *4*(1), 218–255. https://doi.org/10.56910/literacy.v4i1.2096

Tan, X., Cheng, G., & Ling, M. H. (2025). Artificial intelligence in teaching and teacher professional development: A systematic review. *Computers and Education: Artificial Intelligence*, *8*, 1–19. https://doi.org/10.1016/j.caeai.2024.100355

Ulfah, M., & Hina, S. (2025). The role of artificial intelligence (AI) in improving the quality of education in early childhood education programs. *Indonesian Journal of Progressive Pedagogy*, *1*(1), 49–59. https://doi.org/10.61987/ijpp.v1i1.666

Utami, I. G. A. L. P., & Mahardika, I. G. N. A. W. (2023). Grammarly and grammatical errors reduction: A case for non-native English teachers' professional learning. *International Journal of Language Education*, *7*(2), 227–240. https://doi.org/10.26858/ijole.v7i2.46431

Wiranatha, P. A., & Santosa, M. H. (2024). Systematic literature review on students' reading habits in Indonesia in the era of technology. *Gagasan Pendidikan Indonesia*, *5*(1), 27–38. https://doi.org/10.30870/gpi.v5i1.26677

Yuxiu, Y. (2024). Application of translation technology based on AI in translation teaching. *Systems and Soft Computing*, *6*, 1–8. https://doi.org/10.1016/j.sasc.2024.200072