

THE AI PARADOX: A LITERATURE REVIEW ON ARTIFICIAL INTELLIGENCE DEPENDENCY AND STUDENT CRITICAL THINKING SKILLS

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Abstract. *In an era of rapidly evolving technology, Artificial Intelligence (AI) has transformed the way students access information, generated ideas, and acquire knowledge instantaneously. Consequently, many students are shifting away from conventional academic sources such as books and journals in favor of immediate AI-generated answers, often bypassing in-depth analysis and reflective reasoning. This phenomenon presents a paradox: while AI serves as an efficient facilitator of learning, it also possesses the potential to degrade students' analytical capabilities and creativity. This article employs a qualitative library research approach. Data were gathered from relevant books, regulatory documents, journals, and scientific articles. The collected data were analyzed through data reduction, data display, and conclusion drawing. The findings indicate that the disproportionate use of AI drives a shift in the student's role; rather than acting as agents of change and creators, they risk becoming mere consumers of AI-generated information. Therefore, a balance in AI utilization is essential, achieved through the strengthening of digital literacy and critical awareness. This will enable students to integrate artificial intelligence with human intelligence in a reflective, ethical, and productive manner.*

Keywords: AI Dependency; Artificial Intelligence; Critical Thinking; Digital Literacy; University Students

1. INTRODUCTION

The rapid pace of digital transformation, marked by the emergence of Artificial Intelligence (AI) platforms such as ChatGPT and Gemini, has become an inseparable component of students' academic activities. These technologies are extensively utilized for literature searching, ideation, and scholarly writing. In this context, AI plays a pivotal role in expanding learning access and enhancing efficiency within the academic sphere (Kurniasari, 2025). However, this convenience introduces a new paradox: does AI truly intellectualize students, or does it conversely diminish their critical thinking capabilities?

Firdaus et al. (2025) demonstrate that analytical skills and divergent thinking among intensive AI users have begun to decline. This condition has given rise to the concept of a "brainstorming crisis," characterized by students' inability to generate independent ideas without the assistance of AI or algorithmic systems.

This paper aims to analyze the brainstorming crisis as an early symptom of cognitive quality decline in the era of automated knowledge sources. By conducting a literature review, this analysis focuses on three main pillars: (1) AI as a learning source, (2) the risks of AI dependency, and (3) reflective digital literacy as a balancing solution in AI utilization.

2. LITERATURE REVIEW

2.1 Artificial Intelligence (AI)

Artificial Intelligence (AI) is a computer-based system capable of executing functions that typically require human analytical capabilities, such as reasoning, learning processes, and decision-making. According to Russell and Norvig (2021), AI is defined as "the study of agents that receive percepts from the environment and perform actions." In other words, AI is understood as an entity capable of observing its surrounding environment, determining courses of action, and acting flexibly in response to environmental changes.

2.2 Critical Thinking Ability

Critical thinking ability is essential for higher education students, as this skill enables them to filter information judiciously rather than passively accepting claims. Consequently, students possessing this ability also exhibit proficient media literacy. Etymologically, the term "critical" originates from the Greek word "*Kritikos*," meaning "one who offers views based on reason" or "performing analysis, judgment, interpretation, and observation." This term is generally used to describe individuals who question or challenge a scrutinized object.

According to Dewey, 1910, as cited in (May et al., 2022), critical thinking is the active, persistent, and careful consideration of any belief or supposed form of knowledge in the light of the grounds that support it. These beliefs or knowledge are subsequently examined by searching for arguments that support a conclusion. Dewey emphasized that the core element of critical thinking is an individual's cognitive passivity rejection; meaning that critical thinkers are active and do not merely accept external information without a prior filtration process.

3. RESEARCH METHODS

This study employs a literature review methodology to synthesize existing data and elaborate on findings, thereby serving as a framework to construct a lucid discussion on the investigated issue (Andriani, 2021).

The utilized data consists of secondary data obtained from various scholarly literatures, including journal articles, books, and other academic publications highly relevant to the topic studied. These sources were selected based on their relevance, credibility, and contribution to the research discussion.

The data collection process was conducted through literature searches on Google Scholar using keywords aligned with the research topic. The retrieved literature was subsequently screened based on specific criteria, including thematic alignment, publication year, and source quality.

Furthermore, the data were analyzed using a qualitative descriptive analysis technique, which involved reviewing, comparing, and synthesizing the selected literature. The results of this analysis were then interpreted to generate conclusions capable of answering the research problems in a systematic and structured manner.

4. RESULTS AND DISCUSSION

4.1 AI as a Learning Source

AI has functioned as a digital tutor that accelerates comprehension and simplifies access to scientific data and global digital information. Within the framework of uses and gratifications theory, students utilize AI to satisfy their needs for academic efficiency, speed, and information validity (Kurniasari, 2025). However, by relying on AI, students frequently accept final outputs without actively processing or conceptualizing the information during the learning process

(Supriyadi, 2024). Contemporary students regularly utilize various AI-based platforms to expedite their academic assignments.

Nevertheless, the functional shift of AI from a supportive tool to a substitute for the cognitive process induces an epistemological shift. Students no longer function as active subjects of knowledge creation but rather as passive recipients of instant information. This phenomenon indicates the occurrence of *epistemic dependency*, wherein AI does not expand cognitive capacity but directly co-opts it without comprehensive reading practices. Consequently, the natural brainstorming process, which should serve as the foundation for critical thinking, continues to erode.

Thinking is a mental process or cognitive activity occurring in the brain to manage information, solve problems, make decisions, and generate new ideas. According to Supardi (2015), thinking is the act of utilizing intellect to consider, decide, and deliberate within memory. Thus, thinking plays a paramount role in problem-solving.

Brainstorming is a creative problem-solving strategy and one of the most popular cognitive methods used among students and professionals. According to Basuki (2021), brainstorming is a creativity technique that seeks to find solutions to specific problems by gathering spontaneous ideas from group members. Conversely, Wulan (2021) defines brainstorming as a method for collecting a large volume of ideas from a group of people within a short timeframe. This method is commonly deployed in creative problem-solving and can be utilized individually or as part of a broader strategy.

To mitigate epistemic dependency, scholars propose prudent methods for utilizing digital technology. First, students must possess critical digital literacy (Harrison, 2025), which entails the capacity to evaluate AI outputs and recognize that such data is not inherently neutral. Second, technology should be deployed to solve authentic problems rather than merely serving convenience purposes (University of Saskatchewan, 2025). Third, epistemic vigilance is required, whereby students actively examine and question AI outputs prior to acceptance (Ninghardjanti et al., 2025). Consequently, AI can function as a cognitive partner rather than a replacement for human intellect.

4.2 The Paradox of Artificial Intelligence Dependency

While AI serves as a tool to expand knowledge and insights, its application must remain regulated to prevent excessive dependency. AI should be positioned proportionally as a learning guide rather than the sole primary source. According to Diantama (2023), one of the benefits of AI in education is providing asynchronous communication platforms via Learning Management Systems (LMS). Through this system, instructors can prepare materials accessible to students flexibly at any time, eliminating the need for synchronous online presence.

Furthermore, Oktavia & Suseno (2024) note that AI tends to facilitate students in completing both individual and group tasks. AI also helps overcome academic barriers, such as difficulties in locating journals, articles, or other references. Fundamentally, AI technology is designed as a complementary tool in learning for instance, to provide materials that enhance conceptual understanding, accelerate the identification and categorization of required literature, and enable source discovery through specific keywords.

Nonetheless, the deployment of AI among higher education students also carries negative ramifications, particularly a high level of dependency that leaves reasoning skills uncultivated and ultimately weakens critical thinking capabilities.

4.3 Digital Literacy as a Balancing Mechanism

Digital literacy plays a vital role in maintaining an equilibrium between AI utilization and the reinforcement of human cognitive capacity. Holmes et al. (2023) assert that AI literacy encompasses not only technical proficiency but also ethical awareness, critical attitudes, and human contextual understanding regarding current technological advancements. This research aligns with Kurniasari (2025), who proposes the concept of *reflective digital literacy*. This framework encompasses the students' ability to:

- a. Critically evaluate and reflect upon AI-generated outputs.
- b. Utilize AI outputs as conceptual catalysts rather than final answers.
- c. Integrate AI result into problem-based learning processes.

Through reflective literacy, students can position AI as a creative partner (*co-creator*) in the thinking process rather than a surrogate for human cognitive functions. This approach balances the instructional advantages of AI with the development of students' intellectual autonomy.

To counteract the negative impacts of AI, several practical steps can be implemented: utilizing AI strictly as an auxiliary tool rather than a substitute for personal effort; leveraging AI selectively when genuinely necessary (e.g., for reference discovery); refraining from directly copying and pasting entire AI outputs; and avoiding technological misuse by consistently prioritizing academic wisdom.

CONCLUSION

Dependency on Artificial Intelligence has created a contemporary cognitive dilemma in higher education: a tension between expanding intelligence and degrading critical thinking skills. While AI is proven to optimize academic efficiency, it also poses a risk of triggering a "brainstorming crisis", a symptom where individuals lose their capacity for independent ideation, leading to technological dominance over human intellect.

Therefore, AI must not serve as a replacement for the cognitive process. Instead, it should be positioned as an intellectual partner that assists students in sharpening critical thinking, fostering creativity, and preserving ideological originality in the digital era.

REFERENCES

- Andriani Windi. 2021. Penggunaan Metode Sistematis *Literatur Review* Dalam Penelitian Ilmu Sosiologi. *Jurnal PTK dan Pendidikan* 7 (2)
- Basuki, R. 2021. Strategi Peningkatan Pembelajaran Pembinaan dan Pengembangan Bahasa Mahasiswa Program Studi Pendidikan Bahasa Indonesia FKIP Universitas Bengkulu dengan Metode Brainstorming. *Silampari Bisa: Jurnal Penelitian Pendidikan Bahasa Indonesia, Daerah, Dan Asing*, 4(2)
- Diantama, S. 2023. Pemanfaatan Artificial Inteligent (AI) Dalam Dunia Pendidikan. *DEWANTECH Jurnal Teknologi Pendidikan*, 1(1), 8-14.
- Firdaus, Jihan Alifa., Rakhma Imamatul Ummah., Rahma Rizky Aprialini., Ainul Fithriyyah., Mahsusi., Afif Faizin. 2025. Ketergantungan Penggunaan kecerdasan Buatan (AI) pada Tugas Akademik Mahasiswa Terhadap Kemampuan Berpikir Kritis dan Kreatif. *Jurnal Kependidikan* 14 (1)
- Harrison, C. (2025). (Re-)Defining critical digital literacy: what is it, and how should we teach it? *Journal of China Computer-Assisted Language Learning*. <https://doi.org/10.1515/jccall-2025-0006>
- Holmes, W. 2024. AIED-Coming of Age? *International Journal of Artificial Intelligence in Education*, 34,1-11.
- Kurniasari Prahari, Agusti Mardikaningsih, Reno Siska Sari. 2025. Dependensi Penggunaan Kecerdasan Buatan AI (*Artificial Intelligence*) Terhadap Tugas Akademik Mahasiswa. *Jurnal Pendidikan dan Ilmu Social* 4 (3)

**The Sixth International Conference on Innovation in Social Science
and Engineering Education (ICoISSEE-6)**
Bandung, Indonesia, July 25, 2026

- May, C. J., Wittingslow, R., & Blandhol, M. (2022). *Provoking thought: A predictive processing account of critical thinking and the effects of education*. *Educational Philosophy and Theory*, 54(14), 2458–2468. <https://doi.org/10.1080/00131857.2021.2006056>
- Ninghardjanti, P., Umam, M. C., Subarno, A., Winarno, W., Langgi, N. R., & Widodo, J. 2025. Evaluating the impact of AI on the critical thinking skills among the higher education students by combining the TAM model and critical thinking theory. *Frontiers in Education*, 10. <https://doi.org/10.3389/feduc.2025.1719625>
- Oktavia, D. H., & Suseno, G. 2024. Pemanfaatan Kecerdasan Buatan dalam Pendidikan di Indonesia: Potensi dan Tantangan. *Indo-MathEdu Intellectuals Journal*, 5(2), 1680-1686.
- Russell, S., & Norving, P. 2021. *Artificial Intelligence: A Modern Approach* (4th ed.). Pearson.
- Sihotang, K. 2019. *Berpikir Kritis: Kecakapan Hidup di Era Digital*. PT Kanisius.
- Supardi US. (n.d.). *Jurnal Formatif* 2(3): 248-262 Peran Berpikir Kreatif Dalam Proses Pembelajaran Matematika.V. (n.d.).
- Supriyadi, E. 2024. Penggunaan ChatGPT Open AI pada penulisan karya tulis ilmiah dan dampaknya bagi mahasiswa. *Prosiding Nasional 2024 Universitas Abdurachman Saleh Situbondo*, 123 130.
- University of Saskatchewan.2025. *Leveraging Technology Effectively: Part 1 - Teaching and Learning*. Gwenna Moss Centre for Teaching and Learning. <https://teaching.usask.ca/articles/2025-06-03-leveraging-technology-effectively-1.php>