

ARTIFICIAL INTELLIGENCE'S IMPACT ON CRITICAL THINKING

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Abstract

Critical thinking is vital to solving problems and making wise decisions. Exercising this cognitive skill enforces independent thoughts and the ability to decipher whether information is fact or fiction. In recent years, the use of artificial intelligence (A.I.) has become more prevalent in modern-day society. A.I. can be a helpful tool in terms of efficiency and collaboration, but an overreliance of this technology can deplete critical thinking skills. This paper further examines the benefits and consequences of A.I.'s impact on human cognitive abilities. The main findings of two research articles are that A.I. fosters collaboration and efficiency. In some cases, researchers believe that A.I. may also enhance their critical thinking skills. Yet, the overuse of A.I. can lead to cognitive offloading and other dependencies.

Introduction

Critical thinking is the ability to analyze, evaluate, and simplify information to make logical decisions, all of which are essential to succeed in both academic and professional realms. (Gerlich, 2025). Since more people are using A.I., there have

been ongoing debates on how this technology impacts individuals' critical thinking skills. Some believe A.I. creates efficiency and allows for collaboration. Furthermore, those who are in favor of A.I. state that the benefits include real-time answers to inquiries, allowances for collaborative writing and feedback, virtual communication, and the ability to engage with educational material at a deeper level (Ruiz-Rojas et al., 2024).

However, others believe that when one becomes heavily dependent on A.I., it depletes critical thinking skills. Some even argue that when individuals use A.I. for nearly all their tasks, it can lead to cognitive offloading. According to Gerlich, M. (2025), "Cognitive offloading, as described by Risko and Gilbert [6], involves using external tools to reduce the cognitive load on an individual's working memory. While this can free up cognitive resources, it may also lead to a decline in cognitive engagement and skill development." Furthermore, consequences of overuse of A.I. may include the inability to think independently, lack of creativity, laziness, and difficulty determining whether information is factual.

Main Analysis

Despite the debates around A.I. and whether it should be classified as a tool or a dependency, there are benefits to this technology. For example, text-to-speech generators (especially those when used in education) can overcome language barriers. (Chan & Hu, 2023). Additionally, tools such as Canva (produces creative

visualization of concepts) and Zoom (allows virtual communication) can assist one's understanding of a complex topic or allow teamwork on a project (Ruiz-Rojas et al. 2024). In academia, students that have familiarity with technologies such as ChatGPT are more likely to be influenced by its features due to frequent usage (Chan & Hu, 2023). Based on studies conducted by Chan and Hu, students were open to integrating Generative A.I. into education, as some students explained that they thought it was useful to receive personalized feedback and unique insights. Yet, Chan and Hu's study also showed that students are concerned with the reliability on A.I. In other words, students were concerned about becoming overly dependent on A.I. and how Generative AI would affect the value of university education.

Even with its benefits, it is easy to overuse A.I., and the overreliance of this tool results in consequences that are equally detrimental. To measure how cognitive skills are affected by this tool, Bloom's Taxonomy and the Interaction of the Person-Affect-Cognition-Execution (I-PACE) model are common methods. Research conducted by Anderson & Krathwohl, 2001; Bloom et al., 1956; and Calma & Cotronei-Baird, 2021 note that "Bloom's Taxonomy of Educational Objectives is widely used to design curricula, learning outcomes, and goals in business education. Its hierarchical stages—knowledge, comprehension, application, analysis, synthesis, and evaluation—provide a structured pathway for developing cognitive skills" (as cited in Gonsalves, 2024). When researchers applied this method to the study of the connection between A.I. and critical thinking, it showed that ChatGPT was vital for

some students regarding gathering, organizing, and analyzing information. (Gonsalves, C., 2024). However, several experts mention limitations with A.I. usage. For instance, in the study conducted by Chan & Hu, evidence reveals that generative A.I. can yield issues related to ethics, plagiarism, and academic integrity. Other studies, such as the one conducted by Gerlich, state that A.I. models can “reinforce biases and limit exposure to diverse perspectives.” The Interaction of the Person-Affect-Cognition Execution (I-PACE) model serves as a framework to measure the progression and persistence of addictive behaviors related to Internet applications or websites. (Zhang, S., et. Al 2024). The study conducted by Zhang, S., et al. used the I-PACE model to determine if students have developed A.I. dependencies. Through this model, the researchers measured students’ academic self-efficacy, academic stress, and performance expectations. The results showed that students who had low academic self-efficacy were likely to develop a dependency on artificial intelligence when under academic stress. Similarly, the outcomes of the I-PACE model showed that students with high academic stress and low performance expectations were more reliant on A.I. than those with lower academic stress levels and higher expectations.

Artificial intelligence can be helpful, as noted in (Gonsalves, 2024) and (Ruiz-Rojas et al., 2024). Yet, when it becomes a dependency, it can lead to cognitive offloading. “... extensive reliance on external tools— particularly AI—may reduce the need for deep cognitive involvement, potentially affecting critical thinking” (Gerlich,

M., 2025). In Gerlich's study, cognitive offloading was measured using the Halpern Critical Thinking Assessment (HCTA) for three different age groups: 17 – 25 years, 26 – 45 years, and 46 years and older. Based on the results, those who were in the younger age group were more likely to fall prey to cognitive offloading, due to the overuse of artificial intelligence. In Gerlich's correlation analysis, HCTA measured a strong negative correlation between A.I. tool use and critical thinking, indicating that as one uses A.I. more frequently, critical thinking skills are inhibited. The analysis also revealed a strong positive correlation suggesting that increased A.I. usage could lead to cognitive offloading, which leads to decreased critical thinking skills.

Conclusion

A.I. can be a useful tool if it is used in a responsible manner. However, if individuals use it to think and complete tasks for them, it can lead to cognitive offloading. From an observational A.I. should only be used for collaboration purposes (i.e. Microsoft Teams and Zoom). When it comes to academia related activities such as writing papers, problem solving, or any task that involves creativity and strengthens critical thinking skills, A.I. should be prohibited. If universities and workplaces allow A.I. without clearly defined rules on acceptable use of this tool, individuals risk reverting to cognitive offloading, instead of putting in the time and effort to complete a task that requires careful thought and creativity.

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