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Quest International Journal of Medical and Health Sciences – [Online]
EDITORIAL

Artificial Intelligence and Cognitive Decline: A Grave Concern

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Information about the article:

Published online: Dec. 31, 2025
DOI: https://doi.org/10.5281/zenodo.18401588

Publisher

Quest International University (QIU), No.227, Plaza Teh Teng Seng (Level 2), Jalan Raja Permaisuri Bainun, 30250 Ipoh, Perak Darul Ridzuan, Malaysia

e-ISSN: 2636-9478

Artificial intelligence (AI) has evolved from machine-learning diagnostic tools to applications in entertainment and education. AI models, such as Generative Pre-trained Transformers (GPT) and other Large Language Models (LLMs), can revolutionize education by improving teaching and learning practices. Advantages include enhanced reading and writing abilities, enabling personalized learning experiences. AI tools have become an integral part of our lives, ranging from virtual assistants and recommendation algorithms to complex decision-support systems. AI has boosted our efficiency, personalized experiences, and unprecedented access to precise, decisive information at the blink of an eye.

Unfortunately, this is only the bright side of the story. A growing concern among AI users is the potential decline in cognitive function, particularly in critical thinking skills. Cognitive function is the ability to solve problems, make decisions, and reflect on thinking, which are vital for survival and adaptation in complex, dynamic environments. Cognitive decline includes deterioration in memory, executive function, and problem-solving, a hallmark of aging and neurodegenerative disorders. Over Reliance on AI for analysis, evaluation, and judgment reduces the brain's ability to think and decide, gradually degrading memory function.

AI's widespread adoption raises significant concerns about cognitive offloading—the tendency to rely on external systems for tasks traditionally supported by internal cognition. Sole reliance on AI for information retrieval, decision-making, or memory support reduces active cognitive engagement, which is crucial for maintaining critical thinking, problem-solving, and memory encoding [1]. Increased trust in AI tools leads to greater cognitive offloading, thereby diminishing engagement in critical thinking. [2] Recent evidence of AI dialogue systems in educational settings suggests a habitual reliance on AI that can impede the development of analytical skills, critical thinking, and effective communication.

A research study quantitatively demonstrated that increased use of AI tools is directly associated with lower critical-thinking scores, as measured by the Halpern Critical Thinking Assessment (HCTA). [3]

There are significant implications for educational settings, particularly regarding the integration of AI in the classroom. Although AI tools support personalized learning and rapid access to information, educators need to remain mindful of their potential limitations and risks.

Recent research has begun to clarify how generative AI can influence human cognition, particularly by shaping learning outcomes. [4]

Randomized controlled trials have shown that student performance is better when using general-purpose generative AI tools, but there is a sharp decline when they are not used. [5, 6] This is a strong indication that students rely solely on the tool to bypass essential cognitive processes that develop cognitive skills, which ultimately compromises their performance.

Another interesting finding is that generative AI improved learning for those who used it to engage in deep conversations and explanations, but disadvantaged learning for those who were keen to get direct answers. [7]

Ample evidence points to potential risks of AI over-dependence, including reduced mental engagement and neglect of internal cognitive processes when AI systems assume tasks such as calculation, memory recall, or language generation. While direct clinical evidence of permanent cognitive decline attributable to AI remains limited, it warrants further investigation.

Conclusion

AI serves as a powerful tool for cognitive support, yet it also poses risks of cognitive disengagement, in which basic cognitive tasks are outsourced to intelligent systems. Incorporating activities that strengthen critical thinking and promote learning environments where students actively engage with material rather than passively relying on AI tools is encouraged. The distinction between beneficial support and detrimental dependence underscores the importance of using AI, user education on active engagement, and longitudinal research tracking cognitive outcomes over time.

Regards,

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31.12.2025

Keywords

Cognitive, critical, education, engagement, generative, learning, memory

Abbreviations

Artificial intelligence (AI), Generative Pre-trained Transformers (GPT), Large Language Models (LLMs), Halpern Critical Thinking Assessment (HCTA)

Competing interests

None declared.

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References

1. Sparrow B, Liu J, Wegner DM. Google effects on memory: cognitive consequences of having information at our fingertips. Science [Internet]. 2011;333(6043):776-8. https://doi.org/10.1126/science.1207745
2. Gerlich M. The use of artificial intelligence in modern business education: The impact on students' cognitive and communication skills in the United Kingdom. IEEE Eng Manag Rev [Internet]. 2025;53(4):154-67. https://doi.org/10.1109/EMR.2024.3441468
3. Gerlich M. AI tools in society: Impacts on cognitive offloading and the future of critical thinking. Societies (Basel) [Internet]. 2025;15(1):6. https://doi.org/10.3390/soc15010006
4. Sun L, Zhou L. Does generative artificial intelligence improve the academic achievement of college students? A meta-analysis. J Educ Comput Res [Internet]. 2024;62(7):1896-933. https://doi.org/10.1177/07356331241277937
5. Bastani H, Bastani O, Sungu A, Ge H, Kabakcı Ö, Mariman R. Generative AI without guardrails can harm learning: Evidence from high school mathematics. Proc Natl Acad Sci U S A [Internet]. 2025;122(26):e2422633122. https://doi.org/10.1073/pnas.2422633122
6. Darvishi A, Khosravi H, Sadiq S, Gašević D, Siemens G. Impact of AI assistance on student agency. Comput Educ [Internet]. 2024;210(104967):104967. https://doi.org/10.1016/j.compedu.2023.104967
7. Lehmann M, Cornelius PB, Sting FJ. AI meets the classroom: When does ChatGPT harm learning? [Internet]. arXiv [cs.CY]. 2024. https://doi.org/10.2139/ssrn.4941259