



THE RISKS OF ARTIFICIAL INTELLIGENCE USING FOR SCIENTIFIC LITERACY LEVEL

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I wish to thank the journal and its editors for the opportunity to write this short editorial. This issue brings many new ideas and insights into current challenges in science education. In my text, I highlight certain risks associated with scientific literacy and the overuse of artificial intelligence. Artificial intelligence (AI) has become an essential element of modern society, revolutionizing domains such as education and research. It is therefore essential to engage with this technology effectively across all spheres of human activity.

The concept of scientific literacy is frequently invoked in lay society as well as among researchers and professionals in the field. However, its understanding has remained problematic from the past to the present. As Miller (1983) noted, a scientifically literate person would be able to read and write about science at a functional level; this definition has been extended to encompass an individual's ability to read about, comprehend, and express opinions on scientific matters. Holbrook and Taylor (2009) echoed similar concerns regarding the elusive nature of the concept; their study revealed that many pupils experienced stress due to difficulties in operationalizing it, prompting calls to remove the term from school science education altogether. However, the OECD's efforts were successful; in spite of criticism of the concept, the organization deemed the term important for the education of pupils and students. For a correct understanding of scientific literacy, it is necessary to grasp the role of this concept in the educational process. A societal framework must be taken into account, conceptual science must be introduced on a need-to-know basis, and socioscientific scenarios that promote relevance for responsible citizenship must be embraced by pertinent learning and teaching resources meant to improve students' scientific literacy. Some studies also adopt a metaphorical view of scientific literacy, which introduces discrepancies in its holistic understanding. Although it does convey the goals of science education, this metaphorical application has a tendency to make scientific literacy into a catchphrase that means everything to everyone. Therefore, scientific (or scientific and technological) literacy can be used to describe the objective of science education (Murcia, 2009). Despite the above-mentioned factors, scientific literacy plays an important role in the education of all age groups; it is essential for navigating a technology-driven world, enabling individuals to make informed, evidence-based decisions on health, the environment, and policy, while promoting critical thinking to distinguish reliable data from misinformation and fostering a responsible, informed electorate capable of evaluating complex issues like pandemics or climate change (Yang et al., 2025; Varlik, 2025).

Today's world is shaped by innovative digital tools, with artificial intelligence (AI) and its applications playing a dominant role. AI influences all aspects of human life and research disciplines, often yielding highly positive effects. For instance, in healthcare, AI-powered diagnostic tools demonstrate remarkable accuracy in detecting diseases such as cancer, cardiovascular conditions, and neurological disorders – particularly in medical imaging – frequently outperforming human clinicians. These advancements not only improve patient outcomes but also enable personalized treatment plans tailored to individual needs, enhancing treatment efficacy while minimizing side effects. AI further boosts patient care and administrative efficiency through virtual health assistants that schedule appointments, manage communications, and offer medical advice, thereby reducing staff workloads (Faiyazuddin et al., 2025; Najjar, 2023). AI also drives economic growth, though its effects vary by sector and region. While some industries experience rapid transformation and expansion, others face disruptions. Successful AI adoption requires robust infrastructure, data availability, and supportive policies, which differ across economies (Trabelsi, 2024). AI offers additional benefits in education and research. In education, it supports personalized learning by analyzing student performance data to identify struggles and recommend improvements. Adaptive AI systems adjust assignment difficulty to individual needs, enabling precise assessment of learning outcomes (Fang & Law, 2021). In research – especially in biology, medicine, and social sciences – AI processes vast datasets efficiently, uncovering patterns and relationships that traditional methods might miss. However, its use raises challenges and ethical concerns (Ekundayo et al., 2024; Huang & Rust, 2021).

Scientific literacy entails comprehending various types of scientific information and generating original ideas about science. AI and its tools are shifting the landscape of scientific literacy. As noted earlier, AI can automate writing and idea generation processes. Some drawbacks of using AI in scientific literacy include cognitive offloading, where AI summarizes, explains, or analyzes data, students and researchers may bypass essential cognitive processes, resulting in shallower understanding of complex topics. Another issue is over-reliance, which erodes research skills: without practicing finding, reading, and synthesizing literature, users fail to critically evaluate sources or integrate conflicting studies. Additionally, AI generates probabilistic responses that produce “predictable analyses and homogeneous prose,” diminishing the diversity of scientific arguments. Scientific literacy demands engagement with literature and the creation of original research. While AI can assist, it poses risks: tools may fabricate convincing yet non-existent references, citations, or summaries; they often mishandle nuanced scientific contexts, especially in specialized fields; and their output can mimic human work, enabling dishonesty and undermining originality. These issues could erode scientific literacy, leading to misunderstandings of natural and human processes. Educators and researchers should erect barriers against excessive AI use by students. Over-dependence on AI diminishes cognitive abilities, including scientific proficiency. AI tools should serve as assistants, not replacements for student effort.

References

- Ekundayo, T., Khan, Z., & Nuzhat, S. (2024). Evaluating the influence of artificial intelligence on scholarly research: A study focused on academics. *Human Behavior and Emerging Technologies*, 1, Article 8713718.
- Faiyazuddin, M., Rahman, S. J. Q., Anand, G., Siddiqui, R. K., Mehta, R., Khatib, M. N., Gaidhane, S., Zahiruddin, Q. S., Hussain, A., & Sah, R. (2025). The impact of artificial intelligence on healthcare: A comprehensive review of advancements in diagnostics, treatment, and operational efficiency. *Health Science Reports*, 8(1), Article e70312. <https://doi.org/10.1002/hsr2.70312>
- Feng, S., & Law, N. (2021). Mapping artificial intelligence in education research: A network-based keyword analysis. *International Journal of Artificial Intelligence in Education*, 31(2), 277–303. <https://doi.org/10.1007/s40593-021-00244-4>
- Holbrook, J., & Rannikmae, M. (2009). The meaning of scientific literacy. *International Journal of Environmental and Science Education*, 4(3), 275–288.
- Huang, M. H., & Rust, R. T. (2021). Engaged to a robot? The role of AI in service. *Journal of Service Research*, 24(1), 30–41. <https://doi.org/10.1177/1094670520902266>
- Miller, J. D. (1983). Scientific literacy: A conceptual and empirical review. *Daedalus*, 112(2), 29–48.
- Murcia, K. (2009). Re-thinking the development of scientific literacy through a rope metaphor. *Research in Science Education*, 39(2), 215–229. <https://doi.org/10.1007/s11165-008-9081-1>
- Najjar, R. (2023). Redefining radiology: A review of artificial intelligence integration in medical imaging. *Diagnostics*, 13(17), Article 2760. <https://doi.org/10.3390/diagnostics13172760>
- Varlik, S. (2025). Research literacy, socio-scientific reasoning, and problem-solving skills in science teachers. *Journal of Baltic Science Education*, 24(2), 377–389. <https://doi.org/10.33225/jbse/25.24.377>
- Trabelsi, M. A. (2024). The impact of artificial intelligence on economic development. *Journal of Electronic Business & Digital Economics*, 3(2), 142–155. <https://doi.org/10.1108/JEBDE-10-2023-0022>

Yang, Y., Xu, M., Gong, B., Yang, L., & Zang, Y. (2025). Leveraging science fiction to enhance technological literacy and critical thinking in higher education. *Education and Information Technologies*, 30, 20011–20049. <https://doi.org/10.1007/s10639-025-13501-z>

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