

Scientific publishing in the era of artificial intelligence

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In recent years, artificial intelligence (AI) and large language models have rapidly become integrated into many stages of scientific production. AI can be used in various phases of the publication process, including language editing, summarization, literature searches, draft generation, and the creation of visual content. (1). However, each of these applications carries distinct ethical risks. While language-level editorial assistance may be considered relatively low risk, the use of AI in content generation, methodological contribution, or data interpretation raises far more complex concerns. At this point, excluding these technologies entirely from academic publishing is neither realistic nor practical. The core debate is no longer whether AI should be used, but rather how it should be used, for what purposes, and within which ethical boundaries.

In a survey of more than 2,000 medical researchers across 95 countries, 44.5% reported using AI-based tools in their research processes (1). In another survey of over 2,300 researchers from diverse disciplines, regions, and career stages, this rate reached 76% (2). These findings indicate that AI use in academic production is increasingly widespread. In a global survey of approximately 5,000 researchers, most participants considered language-related uses such as language editing and translation ethically acceptable, yet expressed greater caution when AI was used to draft an initial version of a manuscript (3). Although more than 90% regarded AI-assisted editing and translation as ethically permissible, only 28% reported using AI for manuscript editing and 8% for translation (3). The discrepancy between ethical acceptance and self-reported use raises the possibility that AI use may be more widespread than openly declared.

AI-assisted language editing is widely accepted (4). However, while some journals require explicit disclosure of such use, others do not. The boundary between minor linguistic refinement and substantive content modification is often unclear, complicating transparency requirements. Transparency remains one of the most contested areas of AI integration. In psychiatry and mental health journals, only 39% have an official AI policy, with this proportion rising to 56% among Q1 journals and falling to 20% among Q4 journals (4). Furthermore, there is no consensus regarding where AI use should be disclosed within a manuscript (e.g., Methods section or Acknowledgements). Although readers arguably have the right to know whether AI was involved, in an environment where reliable AI-detection remains limited, mandatory disclosure may paradoxically increase the risk of incomplete or inaccurate reporting.

Editorial processes also face significant challenges. At present, reliably detecting AI-generated text appears difficult. Experimental studies show that AI-generated scientific abstracts cannot be perfectly distinguished by human reviewers or automated tools. Gao et al. reported that abstracts generated by a generative AI system were correctly identified by human reviewers only 68% of the time, while AI detection tools, despite relatively high discriminatory performance, were not error-free (5). An experimental study focusing on psychiatric publications similarly demonstrated that both free and paid detection tools produced substantial rates of false positives and false negatives (6). Pratama et al. further noted serious limitations regarding accuracy and bias, particularly the disproportionate flagging of texts written by non-native English

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authors as AI-generated (7). Moreover, current detection tools are unable to determine not only whether AI was used but also the purpose or extent of that use. Strict detection-based policies may therefore risk producing unequal and potentially unjust outcomes.

Beyond issues of detection and transparency, the growing use of AI introduces new risks to scientific reliability. Large language models are known to generate inaccurate or fabricated information. This increases the burden of reference verification and places additional responsibility on editors and reviewers. AI-generated manuscripts may include fabricated data or non-existent results, and distinguishing real from fabricated data is not always straightforward (8). In one study, an AI model was instructed to generate a rheumatoid arthritis study purportedly based on a licensed and restricted-access health database from 2012–2020. Although the model had no direct access to proprietary databases and its training data were limited to content up to 2019, it produced a manuscript containing detailed descriptions as if 2020 data had been analyzed. This example illustrates how AI can present inaccessible data and results as though they were genuine, posing serious risks to scientific publishing (8).

These uncertainties and risks make it increasingly important to clarify how AI should be positioned within academic publishing. An emerging consensus in the scientific community is that AI cannot qualify as an author (9). Authorship requires critical thinking, scientific judgment, ethical accountability, and responsibility, all of which are uniquely human capacities. AI systems lack legal personas and cannot be held accountable for the content they generate. When inaccuracies, bias, insufficient citation, or flawed interpretation occur, responsibility rests solely with human authors (9). Accordingly, AI should be conceptualized not as an author but as a tool that supports human researchers.

Can AI generate hypotheses or interpret findings in a genuinely scientific sense? Large language models learn statistical associations between words and concepts from vast text corpora. Although

their outputs may appear coherent, they are based on pattern recognition rather than conscious reasoning. (9). Experimental work suggests that while AI performs well on narrow, well-defined tasks, it remains limited in areas requiring genuine scientific reasoning, such as hypothesis generation and revising interpretations in light of new evidence. Experiments with a large language model-based generative AI system have shown that the model can provide plausible interpretations but struggles to generate alternative explanations and flexibly update its hypotheses (10). The distinction between producing an interpretation and critically re-evaluating it underscores a fundamental difference between current AI systems and human researchers. To address these limitations, neuro-symbolic approaches seek to integrate current large language models—primarily driven by data-based pattern learning—with symbolic components that more closely resemble human cognition, such as logical rules, causal relationships, and explicit reasoning processes (11). The aim is to move beyond responses grounded solely in statistical similarity and to develop AI systems capable of rule-based inference and more consistent adaptation to novel situations, thereby enhancing reliability and flexibility.

Several organizations, including the Committee on Publication Ethics (COPE), the International Committee of Medical Journal Editors (ICMJE), and the World Association of Medical Editors (WAME), have issued guidance on the use of AI in scholarly publishing (12–14). In this context, Perkins and Roe examined the policy documents of more than 100 publishers to evaluate their approaches to artificial intelligence. Their study identified several recurring themes, including the restriction of authorship to humans, the attribution of ultimate responsibility to authors, the requirement for transparent disclosure of AI use, and the adaptable nature of these policies. (15). However, substantial inconsistencies persist across journals and publishers concerning the scope and manner of disclosure. The CANGARU initiative, involving major publishers such as Elsevier, Springer Nature, Wiley, and COPE, aims a consensus-based framework for AI standards in research and publishing (16). Given the variability in existing guidelines, a widely accepted, standardized AI framework would

provide valuable guidance for researchers, editors, and reviewers.

In conclusion, the debate surrounding artificial intelligence is not merely a methodological issue, but also a matter of responsibility in knowledge production. Science is not simply the generation of plausible sentences; it requires accountability, the willingness to revise claims in light of evidence, and the capacity to justify interpretations. AI is not a person capable of bearing such responsibility. Therefore, AI should not be positioned as a substitute for human reasoning, but rather, under the guidance of critical judgment, as a careful assistant in the process of knowledge production. For this reason, publication policies must establish clear,

applicable, and enforceable frameworks.

Could you truly determine whether the text you have just read was written by a human or by artificial intelligence? Perhaps the more important question is not whether we can tell the difference, but how we preserve scientific responsibility in a world where that distinction becomes increasingly blurred.

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