

Artificial Intelligence in Scientific Publication: Perspectives, Problems, and Possibilities

Manish Pokhrel

Artificial Intelligence (AI), in its many forms, has emerged as a transformative force in the field of modern academic publication. While the rise of AI in scientific publication has sparked enthusiasm and a sense of technological liberation, notably among the young and early-career authors, it has also become a source of unease and a perceived threat to scientific integrity; a feeling particularly echoed by the publishers and the academic purists. Currently, the use of AI in scientific publication is met with mixed responses, often fueled by myths and misconceptions about the possibilities and the limitations of AI.

AI use from the author's perspective:

Scientific publication is a daunting process. Traditionally, authors have taken pride in the amount of time and effort they have put in searching and scrutinizing the millions of papers published across disciplines to find the ones that are tailored to their research interests. This seemingly herculean task can now be simplified by the effective use of Artificial Intelligence. AI-powered tools can synthesize vast datasets and summarize existing research.^{1,2} Machine learning can identify patterns that might remain unnoticed, sometimes even crossing different disciplines, thereby fostering cross-disciplinary collaborations.² Such efficiency during literature review enables the researchers to focus more on the research hypothesis, experimentation, and critical analysis.³

The process of publication is often hindered by the intricacies of grammar and syntax of the English language. Such challenges often obscure the clarity and relevance of the scientific arguments. This is more applicable to the authors whose native language is not English.⁴ The use of AI-powered grammar and language editors can help overcome this barrier, thereby leveling the global academic playing field. Similarly, automated statistical tools can detect errors, flag inconsistencies, and ensure adherence to reporting guidelines. Reference

management is another area where authors are already using AI-powered tools. By removing the subtleties of the non-research elements of publication, AI can allow the researcher to focus more on the research, and can also reduce dread of the publishing process.^{1,2}

Another area where AI can aid authors is the selection of Journals and navigation of the submission process. Every journal has its own scope and submission guidelines. It is often overwhelming to the author to select the best possible platform for publishing one's research paper. AI can be used to select the proper journal based on the scope of the paper. It can also help polish the manuscript to comply with the submission guidelines, thereby reducing the chances of outright rejection.^{1,2}

AI use from the editor's/publisher's perspective:

The modern academic publishing is a big machinery with multiple intricate processes. It has to handle the enormous pressures of ever-increasing article submissions, screen them for relevance, then guide the selected ones through the process of review and corrections till it reaches a final form in a fair, consistent, and timely manner. Such complicated processes can be automated with the use of AI-powered tools. Journals are beginning to use AI-assisted tools to screen whether a submitted manuscript meets the scope of the journal and is scientifically relevant. Systems are available to check manuscripts for plagiarism, grammar, image manipulation, and statistical errors before the manuscript even reaches human reviewers.¹⁻³

The peer-review system is the most important gatekeeper of scientific integrity and academic relevance in the modern scientific publication.⁵ However, the peer review system is under significant strain as it depends solely upon the individual's sense of academic responsibility, and it seldom rewards the reviewers in par with the time and effort it demands. Identification of suitable peer-reviewers can be facilitated by AI, based on the reviewer's expertise

Author affiliations:

Department of Surgery,
Patan Academy of Health Sciences, Lalitpur, Nepal

Correspondence:

Dr. Manish Pokhrel,
Department of Surgery,
Patan Academy of Health Sciences, Lalitpur, Nepal

Email: guru0941@gmail.com

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and records of review completion. Such tools can streamline editorial workflows in high-volume publishing by automating and reducing the burden on humans.^{1,2,6}

AI use from the ethical perspective:

The exponential rise in the use of AI in scientific publications has given rise to several unforeseen and serious ethical as well as epistemological concerns.

The most immediate ethical issue is regarding authorship. There is an ongoing debate as to who should be credited when an AI system generates substantial portions of a manuscript. Current academic norms define authorship in terms of intellectual contribution and accountability, which do not apply to AI, as it lacks accountability and cannot assume responsibility for its errors.⁷ Most of the journals reject listing AI as an author.⁸⁻¹⁰ Similarly, failing to disclose the use of AI may be considered a form of intellectual misrepresentation.¹¹ Transparent declaration about AI assistance is increasingly recognized as essential, yet standardized guidelines remain inconsistent across journals and disciplines.¹²

Closely related is the risk of plagiarism and intellectual homogenization. AI language models are trained on vast bodies of existing text. AI can inadvertently reproduce phrases or ideas without proper citation, blurring the boundary between acceptable assistance and downright plagiarism. Furthermore, widespread reliance on AI could lead to recycling of well-established and more popular ideas and suppression of new and unconventional expressions. This phenomenon also extends to the peer review process. Overreliance on AI tools for the peer-review process would inadvertently privilege conventional research while overlooking groundbreaking but unconventional work. This would result in intellectual homogenization and would lead to regression of all new publications towards a common average baseline.

Bias represents another critical ethical challenge.¹³⁻¹⁵ AI systems learn from existing datasets that may reflect historical and systemic biases. AI-generated analyses could therefore perpetuate bias in citation practices, research prioritization, and interpretation of results.¹⁴⁻¹⁶ Automated peer review systems are also known to promote bias in selecting reviewers based on gender and affiliations.^{6,17} Blind reliance on AI without careful human oversight has the potential to reinforce the disparities that have always plagued the scientific academia.

The integrity of data and results also comes under scrutiny. AI hallucination is a problem common to all the Large Language Models (LLMs) in current use.^{18,19} Misinterpretation of facts, fake citations, missing contexts, or logical fallacies are ingrained in the way AI acquires and processes knowledge. Blind faith in AI-generated content risks disseminating inaccurate or misleading findings, ultimately polluting the scientific literature,

and creating new citation loops. Even an entire scientific article that appears genuine can be generated using AI in a matter of minutes. Such scientific fraud has always existed, but AI has made the process easier and quicker.²⁰ The responsibility for scientific integrity ultimately rests with human authors, but the convenience of AI may tempt some to use shortcuts and avoid rigorous validation processes.

From the intellectual standpoint, the erosion of critical thinking skills is one of the alarming products of AI use. Scientific writing forces researchers to critically review their arguments, evaluate evidence, and confront limitations. When such actions can be done with the click of a button, there is a risk that researchers may engage less deeply with their own work and, over time, lose the foundational skills in scientific reasoning and communication.¹⁵

Future directions and recommendations

Projecting the trajectory of growth in the field of AI, it is evident that it is going to be more capable in the future and will push its possibilities beyond imagination. As more manual actions are replaced with AI-powered tools in scientific publications, newer ethical boundaries are expected to be crossed. However, a blanket rejection of AI in scientific publication as a cure to its ethical implications is neither possible nor desirable. Instead, the focus should be on the promotion of responsible use of AI guided by clear ethical frameworks. Journals and institutions must standardize policies that define acceptable use of AI. However, such guidelines must not be rigid but should evolve with technological advances. Authors must bear the responsibility of being transparent in the use of AI assistance in scientific writing. Researchers, reviewers, and editors need to be trained to understand both the capabilities and limitations of AI tools. The future lies in making access to AI more equitable, and preventing the emergence of a technological divide between the well-resourced and the underprivileged institutions.

Conclusion

There is little doubt to the fact that AI already influences scientific publication in many ways and will continue pushing its own limits in doing so. Therefore, the new path forward should focus on balancing its undeniable merits against the profound ethical concerns it poses. The scientific community has the responsibility of safeguarding the principles that underpin scholarly work, which cannot be done by rejecting the rise of AI, but by embracing transparency and establishing robust guidelines on its use.

Keywords: Artificial Intelligence; Ethics; Publication.

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