Point of View

Artificial intelligence (AI) in scientific publishing: Where should we draw the line?

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Background

Organizations, societies, and people have been dramatically affected by artificial intelligence (AI) (1). With the recent rapid development of technology, artificial intelligence-assisted tools are increasingly used in scientific writing. They have become powerful tools for identifying research gaps, generating hypotheses (based on literature reviews), summarizing findings, writing them (and presenting them visually), automated draft generation, language translation (to make scientific writing more accessible and faster), and improving manuscript quality (2–4). Furthermore, numerous types of analysis and writing, including scholarly and scientific publications, can potentially benefit from the use of AI or natural language processing (NLP) technologies (5). Though it is too early to predict, with exponential development, it will become a tool of trade for researchers (5) to the extent that scientific abstracts and manuscripts would be co-produced using AI-assisted tools (4). In fact, AI co-authors are being named in academic publications (4,5). Furthermore, adding to the complexity, with the recent development of AI systems, distinguishing human-generated work from machine-generated work has become increasingly challenging, raising potential concerns (6).

Known issues of using AI in scientific publishing

One of the biggest dilemmas in using AI-generated content is the originality. The AI-generated content can be considered plagiarized, which is not acceptable (7). Because of this, some journals categorize using AI-generated text and images as scientific misconduct (7). Other concerns about using AI span from ethics to integrity issues, such as regarding the threshold for how much AI-generated content is acceptable and the possibility of AI- assisted technologies turning into 'prohibitively' expensive subscription-based tools (8). Another concern seen in earlier versions of several AI models is accuracy concerns. Writing errors and false referencing were seen to a greater extent in the earlier versions of many AI models (8,9).

Accountability is the second major issue that is being discussed extensively, prohibiting AI from being included as co-authors (5). The attribution of authorship goes hand-in-hand with accountability for the work done in any manuscript; however, AI tools cannot take such responsibility up to now (10). This is important because co-authors need to give approval for their work to be published and take responsibility for the manuscript's content (5).

The third concern arises because of the unacceptability of AI systems in the current legal system, which leads to copyright issues (11). Since AI chatbots are not human beings in the current legal system, AI cannot author copyrighted work from a legal point of view (11).

Review of recommendations and actions

Many journals have come up with recommendations in response to these concerns. The JAMA network has already updated its instruction to the authors recommending that "*non-human artificial intelligence, language models, machine learning, or similar technologies do not qualify for authorship*" (10). The statement also includes that "*authors should report the use of artificial intelligence, language models, machine learning, or similar technologies to create content or assist with writing or editing of manuscripts in the Acknowledgment section or the Methods section if this is part of formal research design or methods*" (10).

The Science journal has already updated its Editorial Policies stating that "*the text generated by ChatGPT (or any other AI tools) cannot be used in the work, nor can figures, images, or graphics be the products of such tools*" (7). Further, it explicitly states that an AI program cannot be an author, and violating this can be considered scientific misconduct (7).

While some governing bodies are still studying this situation, the World Association of Medical Editors (WAME) has recently released recommendations on chatbots, generative AI, and scholarly manuscripts (12). The new recommendation revised the previous recommendation issued on January 20, 2023. The document states five recommendations summarized below (detailed version available from the WAME website): *1. Chatbots cannot be considered as authors. 2. authors should be transparent when chatbots are used and provide information about how they are used. 3. The authors are responsible for the materials provided by the chatbot in their paper. 4. Editors and peer reviewers should specify, to authors and each other, any use of chatbots in the evaluation of the manuscript and generation of reviews and correspondence. 5. Editors require appropriate tools to help them detect content generated or altered by AI* (12).

The Committee on Publication Ethics (COPE) also indicates that AI tools cannot be listed as authors of a paper (13). They further state that the artificial intelligence tools do not meet the requirements for authorship criteria, and as non-legal entities, they cannot decide on conflicts of interest and manage copyright and license agreements. The position statement further elaborates that authors must be transparent in disclosing the use of AI tools, and it should be mentioned how the tool was used and which tool was used, while taking full responsibility for the entire content of the manuscript (including AI-generated content) (13).

What can editors do?

Although generative AI is not new, literature regarding AI technologies in the scientific publishing field is still emerging because the application of AI technology is new (14). Many authors have submitted manuscripts drafted using AI-assisted tools (15). Therefore, protecting research and publication integrity due to the inappropriate usage of AI requires urgent attention (5). In this context, editors should focus on AI-related authorship, avoid plagiarism, and maintain quality (14).

Many governing bodies in publication ethics have banned naming AI tools as co-authors (12,13). Therefore, author guidelines and editorial policies should be updated based on these recommendations to inform and discourage authors from naming non-human AI technologies.

To avoid plagiarism and maintain quality, editors should promote tools to detect unacknowledged AI-created materials, and make authors accountable for the accuracy and integrity of the text being submitted (5,8). Many of the available software packages used by scientific journals already have some features for detecting AI-generated text. In the future, developers can integrate new and innovative software for the detection of text produced by AI in their software products (8). However, the accuracy of this software in detecting AI-generated text (7) and the authors' ability to avoid these checks using paraphrasing AI software is still debatable (8). Furthermore, the authors must be encouraged to disclose the use of AI tools they have used in the Methods or any similar section, and it should be mentioned how the tool was used in detail (12,13). Additionally, there should be more elaborate policies and guidance on how violations of the above code of conduct should be handled (simple warnings to future retractions) (8). Another point to note is that editors of journals should have access to appropriate tools to help them detect AI-generated content. Ideally, these tools should be available regardless of their ability to pay to ensure the integrity of scientific publications (12).

Conclusions

Artificial intelligence technologies can support research; however, they should not replace humans. AI technologies cannot be listed as coauthors and should be used as tools to help humans. Authors in their manuscripts should transparently document the use of AI technologies and take responsibility for AI-generated content. Editors should ensure research integrity and ethics by updating their author's guidelines and editorial policies.

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