








Review Article

Evolution of Emerging Trends of AI in Journal Editing – A Scoping Review

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Abstract: The ever-growing volume of scientific research challenges for traditional publishing models. This necessitates innovative approaches to journal editing and adopting by Artificial Intelligence (AI) in publication. This scoping review aims to explore the emerging trends shaping the field of journal editing by AI. Literature employed to search relevant databases published between 2008 and 2024. A total of 25 studies met the inclusion criteria. The review synthesizes key trends of inclusion of the technological tools integration for manuscript processing, the rise of open-access publishing models, and evolving considerations around research ethics. The study underscores the pivotal role of emerging trends in shaping the future of scientific publishing. It offers valuable perspectives for editors to adeptly maneuver through the evolving terrain of scholarly communication. By suggesting possible best practices, it serves as a beacon for maintaining editorial excellence. Furthermore, it identifies critical domains warranting deeper exploration, thereby setting the stage for continuous advancement in the field. This forward-looking approach not only facilitates informed decision-making but also fosters a proactive stance towards embracing change in scientific discourse.

Keywords: Scientific publishing, journal editing, emerging trends, open access, technology, research ethics

Introduction: For more than 350 years, academic journals have provided an outlet for the dissemination of biomedical research findings¹. The history of journals is marred by

evidence of development in the realm of journal submission review, and modern peer review is the apotheosis of that development². Scientific and academic publishing is an

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inherently international enterprise in which an estimated 5,000 to 10,000 publishers are involved. These activities further involve a scholarly community of about eight to nine million in 17,000 universities worldwide. This immense network draws out the collaborative and expansive character of academic work³. Out of these, around 1.9 million articles were peer-reviewed and published in the year 2012. Also, around 1.8 million peer-reviewed articles were accessed universities worldwide. This immense network draws out the collaborative and expansive character of academic work³. Out of these, around 1.9 million articles were peer-reviewed and published in the year 2012. Also, around and downloaded as per the report of Ware and Mabe in the year 2012³. Securing publication is indeed a challenging and lengthy journey. It requires not just research expertise and the capacity to present arguments to a professional readership, but also involves extended and occasionally tough negotiations with reviewers and editors⁴.

Scientific integrity is vital for public trust and practical application. Errors, fraud, and unreliable research erode confidence and squander resources. Rigorous peer review, including post-publication scrutiny, is crucial to ensure research quality and rebuild trust, particularly amidst the challenges of open access and predatory journals⁵.

Scientific publishing has traditionally relied on peer-reviewed journals to ensure the quality and credibility of research. However, this model is facing challenges as it takes time to publish an article due to the lengthy process, and alternatives that are reshaping the landscape with the help of publishing applications, machine learning, and artificial intelligence to shorten the process of publication process. This paper provides a comprehensive overview of the current trends in journal editing, focusing on the evolution of peer review, open access, and digital innovations.

Methodology: Adopting the Scoping Review framework proposed by Arksey and O'Malley⁶, the review was conducted to identify and analyze relevant literature on the topic. Following the framework, literatures were searched in databases of PubMed, Scopus,

and Web of Science using keywords like "scientific publishing," "journal editing," "peer review," "journal publication history" "AI Usage", "Plagiarism Detection", "Skill Development, "open access." Articles published between 2008, and June 2024 were included in the review. This research exclusively examined articles written in English. The included journals implemented a peer-review system, AI editing tools, plagiarism detection policies, open-access publishing, and measures to empower editors.

Data were extracted from the article's title, authors, year, journal, discipline, aim, methods, results, and conclusions. A thematic analysis approach was used to synthesize the main findings and themes emerging from literature.

Findings: In recent days the journal publication process is complex and lengthy process from submission of the manuscript to publication. Figure 1 shows the recent trends of publication process. Finding addresses the evolution of every step of the journal editing and publication process with some modification.

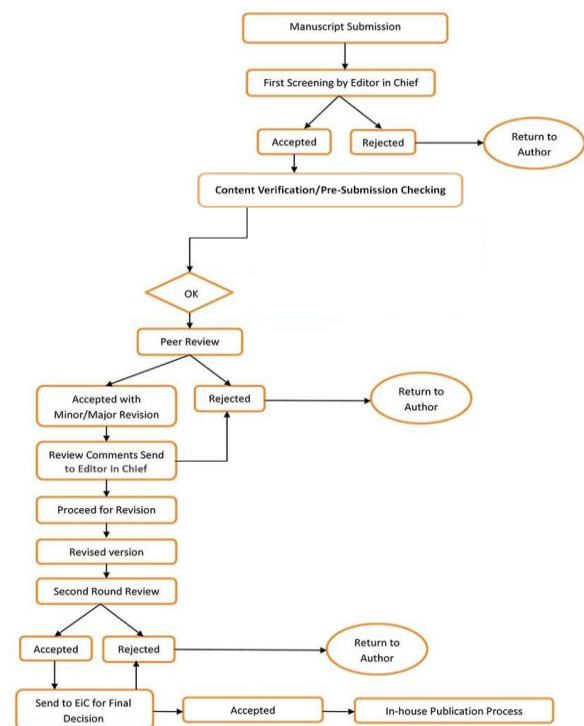


Figure 1 shows the recent trends of publication process. Source: Bentham Open⁷

The process of journal editing encompasses a diverse range of responsibilities, from the initial selection of manuscripts to the final publication and distribution of the journal. The journey of journal editing begins with the submission of manuscripts by authors. Journals are typically owned by either academic associations or publishing houses, which appoint an editor to oversee the editorial process⁹. The editor's primary role is to evaluate the submitted manuscripts, ensuring that they meet the journal's standards and adhere to its scope and mission¹⁰.

Once a manuscript is accepted, the editor coordinates the peer review process, enlisting the expertise of subject-matter specialists to provide constructive feedback and recommendations for improvement¹¹. This step is essential in maintaining the academic rigor and credibility of the published work.

The editor then works closely with the authors to address the peer reviewers' concerns, guiding them through the revision process and ensuring that the final manuscript meets the journal's requirements.¹¹ This collaborative effort between the editor and the authors is crucial in enhancing the quality and clarity of the research presented. This scoping review reveals that most of the evolution occurs in the Peer Reviewing Process, Open Access Publishing, and in Digital Innovations.

Evolution of Peer Review

Traditional Peer Review: Early scientific journals required editors to solicit and select manuscripts. Contrary to popular belief, the use of peer reviewers was not a centuries-old practice but was introduced in the 18th century and became standard only in the latter part of the 20th century. Initially, external referees were used to protect the reputation of the publishing scientific society rather than to assess article merits (Ref). Many editors handled the vetting process alone until after World War II. Major journals like 'Science' and 'JAMA' did not routinely use external referees until after the 1950s (Ref), and 'Nature' and 'The Lancet' adopted this practice in the 1970s (Ref). The shift to using external referees was driven by the increasing volume of specialized submissions and the need for greater scientific accountability due to increased government spending. The term "peer reviewer" replaced

"referee" to emphasize that scientific decisions should be made by experts to avoid political interference¹².

The conventional model involves rigorous evaluation by experts, ensuring the validity and reliability of research¹. In traditional peer review process, a structured evaluation is done where submitted manuscripts undergo rigorous scrutiny by experts in the field. Reviewers offer critical feedback, identifying strengths, weaknesses, and areas for improvement. Authors then refine their work based on these insights, often engaging in multiple rounds of review until the research meets the journal's standards. Upon acceptance, the research is disseminated to the scientific community through publication¹³.

This process effectively identifies and addresses errors, biases, and methodological flaws, bolstering the trustworthiness of scientific knowledge¹⁴.

Despite its merits, the traditional peer-review system has faced criticism and challenges. One major concern is the time-consuming nature of the process. Peer review can be slow, often taking several months or even years from submission to publication¹⁵. This lag can hinder the timely dissemination of critical research findings¹⁶.

Open Peer Review (OPR): Open review and OPR are growing concepts lacking precise definitions. While they share significant overlap, a distinction can be drawn: some forms solicit feedback from any reader, regardless of anonymity, while others restrict comments to qualified peers. However, standardized terminology for these variations is absent, and both terms can be applied interchangeably¹⁶.

OPR involves publishing review reports and reviewers' identities alongside articles. Although it has been slow to gain widespread acceptance, its adoption has increased since the early 2000s. This study provides a comprehensive investigation of OPR adoption, identifying 617 journals that published at least one article with open identities or reports by 2019¹⁷.

Two main factors define transparency in OPR that are reviewer names, affiliations, credentials and open reports (timestamped review histories, referee reports, author

rebuttals, editor letters). The accessibility of open reports also influences transparency. Publishers of optional OPR journals should include metric data in their annual reports¹⁶.

Post-Publication Peer Review (PPPR): PPPR is emerging as a complement to traditional peer review in academic publishing, offering faster dissemination and broader discussions. It involves various forms such as online platforms and social media, and while it accelerates the sharing of research, concerns about the quality of non-peer-reviewed data persist. The challenge lies in balancing the benefits of PPPR with the need for reliable, peer-reviewed findings¹⁷.

PPPR (PPPR) is an open evaluation process where anyone can assess a published article and propose improvements. Unlike traditional peer review, which occurs before publication, PPPR takes place after the article is publicly available¹⁷.

Pre-publication peer review involves editors selecting experts to evaluate a manuscript, while PPPR allows open assessment by the broader community. F1000 represents a hybrid model, inviting specific reviewers but permitting public commentary. Advocates of PPPR suggest it can correct the scientific literature and restore faith in research, whereas critics liken it to unqualified online commentary¹⁸⁻²⁰.

PPPR functioning not as a conventional journal but as an open science platform that allows for article revisions. Articles are updated online, with clear documentation of changes and prior versions. This transparency extends throughout the peer review process, facilitating manuscript evolution with new findings. Critics, however, argue the accessibility of outdated versions with potential errors poses a problem. Recent studies suggest a decline in the frequency and relevance of online comments on platforms like PLOS and BMC. Additionally, PubPeer emerges as a significant PPPR platform, enabling discussions on publications with options for identified or anonymous commentary²¹.

Evolution of Publication:

Traditional to Open Access Publishing: Researchers understand the importance of publication for career growth, but selecting between open access and traditional

publishing is a daunting task. The rapidly expanding scholarly publishing ecosystem, with over 42,000 active peer-reviewed journals in 2018 and growing at a rate of over 5% yearly, exacerbates this challenge²².

Open Access Publishing (OAP): OAP makes research freely available to anyone, allowing for unrestricted reading, downloading, and sharing. Funding for these articles often comes from author fees, institutions, or grants. In contrast, traditional publishing restricts access to articles behind paywalls, limiting their reach and distribution due to copyright protections²³. There are several types of OAP:

1. Gold Open Access: Gold OA means that the final published version of someone's article is permanently and freely available online for anyone, anywhere to read. An article publishing charge (APC) is usually applicable if you publish gold OA²⁴.

2.Green Open Access: Green Open Access, commonly referred to as self-archiving, involves depositing a pre-publication version of your research paper in digital repositories or on a website. This practice allows you to disseminate your work widely without the necessity of covering an Article Processing Charge (APC)²⁴.

3. Diamond Open Access: Diamond Open Access represents a publishing model for academic journals that is free for both authors and readers, eliminating any financial barriers to knowledge sharing. These journals are typically managed by academic communities, ensuring that they cater to diverse, often niche, scholarly groups across various languages and cultures, thus promoting biblio-diversity. This approach inherently supports fairness and inclusivity in academic publishing²⁵.

Evolution of Digital Innovations:

1.Preprint Servers: Preprint servers are online repositories which enable one to post their early version of paper online. In some academic disciplines preprint servers are now commonly used. Among the most well-known are: ArXiv (physical sciences), SocArXiv (social sciences), bioRxiv (biology)²⁶.

2. Data Sharing and Repositories: Research Data Repositories are essential for preserving, organizing, and sharing research data. They facilitate data discovery, reuse, and validation,

supporting the research lifecycle and ensuring data integrity²⁷.

3.AI and Automation: Utilizing Artificial Intelligence to streamline the editorial process and detect plagiarism. At present AI is being used almost in every steps of journal publication, especially by large and renowned publishers. Example includes Large Language Models (LLMs) like ChatGPT to summarize the article, automated article submission platform, literature reviewing platforms, plagiarism detection, reviewer selections, grammar editing, data integrity check, data visualization, referring applications and so on.

Discussion: Between the 17th and 20th centuries, the number of active scientific journals expanded at a steady rate of 3.46% annually. This exponential growth resulted in a doubling of the journal count approximately every 20 years²⁸. Regarding the expansion of scientific study, Derek J. de Solla Price was the first to quantify the rapid expansion of scientific knowledge. His research indicated that the overall size of science doubled approximately every 10 to 20 years between 1665 and 1961, demonstrating exponential growth²⁹.

The early scientific community was a small network primarily exchanging knowledge through informal channels like letters and presentations, alongside formal publications. As the field grew, scientific journals emerged as a key dissemination platform, with editors selecting content based on perceived interest or affiliation with the journal's associated learned society³⁰. Scientific publishing in the early days was much based on the reputation and judgment of well-known scientists. A very good example is the acceptance of the Watson and Crick paper, which broke all conventions; it was accepted right away because of the reputation of the authors and colleagues, and not through the process of formal peer review. Specialization that followed brought limitations to the fore. To be objective and of a great standard, it later became routine practice with the process of peer review, where journals such as *Cell* were the first to popularize its wide adoption³⁰.

Although the first scientific journal, *Philosophical Transactions of the Royal Society*, appeared in 1665, formal peer review in the form of the practice today did not really

begin to take shape until the mid-1970s³⁰. It is basically the process whereby a journal editor chooses a few experts who review a submitted research paper. The reviewers grade the scientific soundness of the study and the importance of the research toward the relevant field. Afterwards, the editor shares the feedback from the reviewers with the author, deciding whether to accept, request a revision, or reject the manuscript³⁰. At present peer review is the underpinning of current scientific publishing. It is supposed to protect the validity and reliability of research. Generally perceived as being a practice that is as old as time, its present form is only a few decades old³¹. Recently, to make the publications more transparent, publishers introduced Post-Publication Peer View process¹⁸⁻²⁰.

The concept of freely accessing research papers online predates the coining of the phrase "Open Access." Thus, early practices date back to the 1970s with computer scientists and grew in the 1990s through platforms like arXiv. A formal proposal for its general adoption was formulated in 1994³². The "open access" ideal materialized from three influential declarations made in the early 2000s: the Budapest Open Access Initiative, February 2002; the Bethesda Statement on Open Access Publishing, June 2003; and the Berlin Declaration on Open Access to Knowledge in the Sciences and Humanities, October 2003. To begin with, open access was a program for providing free, unfettered online access to academic research—particularly, articles published in scholarly journals³³.

Researchers aim to disseminate their research findings to a specific target audience through academic journals. To enhance transparency, accessibility, and efficiency, journals have incorporated Peer Review Processes, adopted Open Access Models, and increasingly utilized AI automation.

The evolution of scientific publishing is marked by a shift towards greater transparency, accessibility, and efficiency. OPR and PPPR are fostering a more collaborative and transparent review process. Open Access Models are democratizing access to scientific knowledge, while digital innovations are enhancing the speed and efficiency of research dissemination.

Conclusion: With open access, digital innovations, and changing peer review models, the journal publication process is undergoing significant transformation. These changes present opportunities for each research to reach more people and offer a way to collaborate. But as we embrace this future, we must be ready to face challenges such as quality assurance, equal access to information and ethical issues surrounding technologies used in publishing.

Recommendations:

Based on the findings of the scoping review, the following recommendations are proposed:

For Journal Editors and Publishers

- Encourage the adoption of OPR models to enhance transparency, credibility, and efficiency in the peer review process.
- Develop robust platforms and tools to support OPR, preprint servers, and data sharing initiatives.
- Provide comprehensive guidelines and resources to authors on open access publishing options, preprint servers, and data management.
- Utilize AI-powered tools to streamline editorial processes, enhance manuscript evaluation, and detect plagiarism while ensuring human oversight.
- Promote the development of Diamond Open Access journals to increase access to research in underserved fields.

For Researchers

- Prioritize open access options to maximize the impact of research findings.
- Share research early through preprint servers to accelerate knowledge dissemination and gather feedback.
- Adhere to data sharing principles and deposit research data in appropriate repositories.
- Contribute to the peer review process to enhance the quality of published research.
- Continuously update knowledge on emerging technologies and their

applications in research and publishing.

For Policymakers and Funding Agencies

- Allocate resources for open access infrastructure, data repositories, and research data management.
- Implement policies that promote open access, data sharing, and responsible use of AI in research.
- Support research to evaluate the effectiveness of different peer review models and identify best practices.
- Provide funding for research integrity initiatives, including plagiarism detection and research misconduct prevention.

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