Received: 01 January 2025, Revised: 15 February 2025, Accepted: 20 February 2025, Available online: 23 February 2025

Journal of Scholarly Communication
DOI: https://doi.org/10.62160/JSC26

RESEARCH ARTICLE

Change before We Have to: What ELife and Artificial Intelligence are Telling Us

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Keywords: eLife; AI; Scholarly Publishing; Peer Review; Scholarly Communication; Open Science

ABSTRACT

Scholarly publishing is being reshaped silently by both inner and outer forces. eLife's innovative publishing framework and the emergence of artificial intelligence (AI), while arising through distinct evolutionary pathways, converge to reveal deeper development trajectories within contemporary knowledge ecosystem. The scholarly publishing is undergoing structural transformations in response to mounting pressures from escalating output volumes, intensifying efficiency demands, evolving reliability thresholds for peer-review systems, and contested governance mechanisms. The long-entrenched frameworks of scholarly communication now face intensifying contestations, particularly in the ossified metrics-driven evaluation regime and the emerging discussions about definitions and ethics to reconcile open science. Despite their imperfections, these transformations are collectively contributing to the erosion of communicative barriers and facilitating accelerated knowledge exchange in scientific communities. To see a world in a grain of sand. eLife and AI are highlighting the transformation occurring within scholarly publishing and its associated ecosystems. It is imperative that we embrace change proactively, rather than reactively.

As a platform of scholarly communication for centuries, scholarly publishing has been playing an important role in advancing science and technology. As research outputs grows and information technologies advance, scholarly publishing continuously evolves, either actively or passively, to meet the emerging demand from academic community for faster, more accurate publication and dissemination of research findings. Scholarly publishing today is mired in multiple challenges: economic barriers created by high subscription and publishing fees hinders equitable knowledge access; long established patterns "publish or perish" by accept/reject decisions rejects valuable findings and amplifies bias; shortage of qualified volunteer reviewers, confronting surging submissions, imperils peer-review credibility and sustainability; successive lengthy submission-to-publication period impedes the dissemination and application of scientific discoveries; academic misconduct, entwined with emerging technologies, casts unprecedented uncertainty over publishing norms and ethics; etc. Diverse challenges have sparked multifaceted solutions. The alteration of the academic community and development of advanced technologies have brought emerging shifts in scholarly publishing. eLife model [1] and artificial intelligence (AI) [2] are the most compelling ones. The eLife model, with its innovative publishing practices, challenges the authority of traditional journals, while AI technologies exert a silent yet profound disruption across the entire lifecycle of scholarly work—from manuscript production and

peer review to publication and dissemination. Divergent changes often mirror the same underlying cause. Though seemingly disparate, these emergent phenomena reveal analogous developmental trajectories, driving transformative changes in scholarly publishing and envisions a new paradigm for its future. This article is attempting to explores the hidden drivers reshaping scholarly publishing, using the seemingly disparate examples of eLife and AI as its lens.

1 | Transformations in scholarly publishing paradigms

Scholarly publishing has been following a worldwide recognized pattern to ensure accuracy and equity, which is difficult to change though it exists flaws. Peer review is undeniably one of the most recognized and the most widely used evaluation means among academic communities. But we also should admit its imperfectness, for example, individual limitations for knowledge and experience, inconsistent views among academic clusters, misconducts, etc. The imperfection of peer review might influence the accept/reject decision of individual manuscript and could also be taken advantage of in chasing speed and profit. We also facing a situation of many peers but few reviewers to the increasing massive submissions [3], particularly in biological fields where manuscripts now routinely contain massive datasets, inevitably prolonging publishing timelines[4]. Regarding equity and efficiency, what are the scientific ways to set the required reviewer number, to examine the reviewer qualification, and to shorten the publishing time? Emerging preprint platforms like bioRxiv, medRxiv, and arXiv represent promising attempts to deal with these issues. However, the lack of formal peer review on preprint papers means professional quality control deficiency, leaving non-specialists cannot judge their credibility. This may lead to the dissemination of low quality information on social media, potentially undermining the public's trust in science [5]. Some institutes or funding bodies even exclude preprints from career advancement or fellowship application [6]. Then, the eLife model emerges as a groundbreaking solution through its "reviewed preprints" initiative. By shifting from "publish after review" to "publish then review", eLife establishes a transparent, collaborative evaluation framework. This paradigm transforms peer review from a judgement of submissions' fate into a constructive dialogue, in which reviewers focus on substantive feedback rather than binary acceptance/rejection decisions. Published works in eLife integrate multiple evaluation dimensions, including eLife assessment (editorial synthesis), public reviews (transparent referee reports) and author response (optional rebuttal). This multilayered evaluating architecture empowers both specialists and general readers to critically assess research significance. Through fair and transparent quality assessment while maintaining rigorous standards, eLife proactively pioneers a new attempt and possibility where scholarly communication back to research itself.

If eLife model's peer-reviewed preprints represent the scholarly publishing community's proactive attempt to change, then the advancement of AI technologies is compelling traditional publishing systems to undergo reactive paradigm evolution. AI has lowered the technical barriers to scientific writing, hitting scholarly publishing system in two distinct aspects: firstly, language barriers are no longer an impediment to academic writing. Journals have to struggle to cope with the surge in manuscript submissions [3], exacerbating publication pressures; secondly, AI-generated "hallucinated data" and "pseudoscientific logic" are infiltrating scholarly manuscripts through undetectable means, posing challenges to commonly-used misconduct detection measures[7-8]. It is particularly noteworthy that generative AI's capacity to simulate author's writing in a specific field and imitate reviewer or editor's decision-making mode to write review opinions [9]. AI even fabricates a deceptive list of references that is difficult to identify without in-depth verification by reviewers and editors [10]. This technological disruption compels the publishing system to reconstitute its scholarly quality control frameworks. On the institutional level, mandate explicit AI usage declarations with authorial accountability. On the technology level, establish AI-generated content detection and certification protocols. Necessarily, these measures must balance ethical compliance with operational efficiency, ultimately fostering symbiotic advancement between scholarly communication and scientific progress. Whether flaws in the existing paradigm or the uncertainties from emerging technologies, they are all reminding of the transformation of scholarly publishing. It is necessary to take actions to maintain accuracy and equity in scholarly publishing.

2 | Challenges to traditional authorities and principles

Long-term-dependent publishing paradigms and related communities constitutes a vast and complex system associated with scholarly publishing. Within the system, there exist established rules and indicators whose validity and practicality are currently being called into question.

The eLife model presents challenges to traditional evaluation ecosystem within the scientific community, revealing fundamental contradictions in quantitative assessment paradigms under the "publish or perish" culture. Databases represented by Web of Science have established an evaluation ecosystem centered on journal impact factor, while the scientific community has long relied on this instrumental metric to simplify talent assessment [11-12]. This compels researchers to pursue journals with high impact factor for career advancement or funding opportunities, effectively reducing the value of academic achievements to "journal branding". By eliminating the traditional binary acceptance/rejection mechanism and publishing preprints with public review as its core process [1], eLife directly undermines the authority of journal impact factor. In this mechanism, evaluation of research achievement no longer depends on journal labels but dynamically reflects through open reviews and community feedback. eLife places greater emphasis on the value of the research process, even publishing papers with negative results; papers with compelling approaches and individual intriguing finding but might not be complete stories; papers that seem wrong in interesting ways; and papers on controversial topics where public peer review would be particularly useful. This transformation may compel the scientific community to re-examine evaluation criteria. However, eLife's transformation in turn encountered considerable resistance: on one hand, scientific community remain trapped in "metric dependency" with limited tools to assess academic value; on the other hand, although Clarivate has introduced a preprint citation linkages between

preprints and formally published papers, its core evaluation systems, such as Journal Impact Factor (JIF) and Journal Citation Reports (JCR), still exclude open science metrics like preprint citation data and transparency in peer review. This lag creates a conflict between open science and closed evaluation standards. The eLife model spotlights the paradox in current academic evaluation—while attempting to break the shackles of "journal-based assessment", it has not yet fostered alternative consensus, forcing researchers to navigate between the "ideal of open science" and the "reality of evaluative constraints."

While the eLife model is challenging the "authority of outcomes" in academic evaluation assessment, AI fundamentally destabilizes the "process rules" of academic innovation, compelling traditional publishing systems to confront both challenges in ethics and paradigms. The traditional publishing system assumes that papers should involve independent innovative work by human researchers, with clearly attributable authorship and traceable contributions. However, generative AI blurs these principles. When researchers employ AI for literature review, data analysis, or even manuscript writing and figure creation, should AI be listed as an author? AI authorship policies vary among publishers and discipline of the journals, but 98.9% policies explicitly prohibit AI tools included in the authorship list [13]. This instrumental positioning for AI conflicts with "AI collaborative creation" advocated by some researchers, exposing the paradox in publishing rules and technological revolutions[9]. Furthermore, more profound implications emerge when it comes to the redefinition of "scholarly innovation." If AI can generate hypotheses or experimental designs with novelty (such as the chemistry robot Adam [14]), should the experimental results deem as " scholarly innovation"? And how to deal with intellectual property issues? These controversies are challenging scholarly publishing and the academic community to re-examine ethical rules and integrity principles.

3 | Barriers-breaking for rapid academic exchange

Academic exchanges are subject to many limitations such as database subscriptions, conference locations and times, language, etc. The academic community has always been committed to fostering a vibrant environment for academic exchanges. The integration of AI and eLife model is promising to have a synergetic effect in breaking barriers in academic exchanges. The eLife's preprint-integrated review reduces median time from submission to publication from 231 to 89 days [15]. AI-driven multilingual translation tools also accelerate the manuscript preparing and publishing, accelerating the production cycle of research outcomes. For instance, Systematic Processing and Automated Review Kit(SPARK) automates the processes of literature collection, organization, and screening, and provides a framework for data extraction, thereby enhancing research efficiency. Furthermore, global reach of research are broadened through preprint and AI, enhancing the concept of Open Science. eLife's trained professional editors and regulations ensure the quality when embracing preprints, and AI tools sharing knowledge to the users are both source and sink of Open Science. Additionally, AI tools not only broaden the global reach of non-English research but also elevate the visibility of non-English researcher, potentially improve the fair and equity in scientific research. And AI-generated visual abstracts transform complex research findings into accessible formats for both experts and general public, empowering knowledge acquisition and dissemination. When physical and lingual barriers are eliminated, academic exchange will significantly speed up.

4 | Conclusion

Imperfections always exist in any system or process, particularly when new elements are introduced into an existing system. eLife's quality control mechanism is questioned by the community, and AI related ethical principles and integrity tools are still on the way. More importantly, we must consider the transparency in algorithms and fairness in training data to prevent falling into a new academic colonialism. If AI tools persistently prioritize English-centric or top institutional perspectives, they risk exacerbating the Matthew Effect already existed in traditional publishing systems. Ethical frameworks must be embedded into technological development to ensure AI truly serves the scientific community.

When the computational deluge of AI resonates with the institutional innovations of eLife, we stand at a "singularity moment" in the history of scholarly publishing. The question we face is not whether to change, but how to master the survival principle. The eLife model demonstrates that traditional publishing inherently carries the genetic code for self-reinvention, while AI technology reveals how instrumental rationality can catalyze institutional innovation. Their synergy transcends mere institutional innovation or technological substitution by means of accelerating knowledge metabolism, redefining value standards, and restructuring authority structure. We are witnessing the evolution of "scholarly publishing" from static "knowledge containers" to dynamic "knowledge ecosystems." Scholarly publishing must proactively undergo three paradigm shifts: from defensive detection aimed at blocking AI-generated content to offensive utilization by constructing human-AI collaborative knowledge engines; from passively adapting to open science to actively designing open ecosystems by learning from eLife's experience; and from patching evaluation metrics to reconstructing academic value systems. We should admit that the evolutions from eLife, AI, and more such elements in the believed future are a natural choice by the academic community, reflecting the trends of both research and publishing. "Change before we have to" is far from an empty slogan—it is a strategic imperative for the continuity of intellectual progress. The path forward will undoubtedly be a deep coupling of technological empowerment and institutional reinvention.

Acknowledgments

The authors declare that DeepSeek (DeepSeek-R1-Distill-32B) was used to assist with language editing to enhance the clarity and accuracy of the manuscript.

Author Contribution Statement

W.X. contributed to write original draft. Z.J. conceived the original idea and revised the manuscript.

Ethical Statement

This study does not contain any studies with human or animal subjects performed by any of the authors.

Conflicts of Interest

The authors declare that they have no conflicts of interest to this work.

Data Availability Statement

Data sharing not applicable to this article as no datasets were generated or analyzed during the current study.

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