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VIEWPOINT

Using AI to enhance scientific discourse by transforming journals into learning communities

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ABSTRACT

The introduction of generative AI into scientific publishing presents both opportunities and risks for the research ecosystem. While AI could enhance knowledge creation and streamline research processes, it may also amplify existing problems within the system. In this viewpoint article, I suggest that generative AI is likely to reinforce harmful processes unless scientific journals and editors use these technologies to transform themselves into vibrant knowledge communities that facilitate meaningful discourse and collaborative learning. I describe how AI could support this transformation by surfacing connections between researchers' work, making peer review more dialogic, enhancing post-publication discourse, and enabling multimodal knowledge translation. However, implementing this vision faces significant challenges, deeply rooted in the entrenched incentives of the current academic publishing system. Universities evaluate faculty based largely on publication counts, funding bodies rely on traditional metrics for grant decisions, and publishers benefit from maintaining existing models. Making meaningful change, therefore, requires coordinated action across multiple stakeholders who must be willing to accept short-term costs for long-term systemic benefits. The key to success lies in consistently returning to journals' core purpose: advancing scientific knowledge through thoughtful research and professional dialogue. By reimagining journals as AI-supported communities rather than metrics-driven repositories, we can better serve both the scientific community and the broader society it aims to benefit.

Keywords: Editor, Generative AI, Journal, Research Industrial complex, Scientific publication

Introduction

The introduction of generative AI into the research publication process presents unprecedented opportunities for journals and authors, as well as significant risks. While this technology could enhance the process of knowledge creation (1), generate novel hypotheses (2), and streamline the research process (3), it may also reinforce and amplify existing problems in scientific discourse and academic publishing (4).

One of the most fundamental of these problems is the conflict of interest between publishers and their journals, universities, and funding organizations. This ecosystem prioritizes metrics like publication counts and impact factors over meaningful contributions to knowledge creation, creating powerful incentives for researchers to focus on quantity over quality (4).

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This viewpoint article explores these risks, as well as the ways in which AI could be harnessed to improve scientific discourse. First, I examine how AI might exacerbate existing systemic problems in scientific publishing, intensifying the pressure for increased publication volume at the expense of meaningful contributions. Next, I discuss how AI could instead be used to transform journals into AI-supported learning communities, fostering more engaged and collaborative knowledge creation. Finally, I outline the challenges that must be addressed to implement these changes, including systemic barriers within academic publishing.

How a research industrial complex shapes scientific publishing

The concept of an "industrial complex"—first articulated by President Eisenhower in describing the military-industrial complex—helps illustrate the problematic dynamics in the academic publishing ecosystem. Just as the military-industrial complex creates self-perpetuating cycles that prioritize institutional interests over the public good, today's research publishing system has developed its own self-reinforcing patterns that might work against the interests of patients and practitioners (5). While the academic publishing ecosystem may not exactly mirror other industrial complexes, the analogy usefully highlights how interconnected institutional incentives can create self-perpetuating cycles that prioritize metrics over their purported missions. Just as defense contractors benefit from

continued military spending regardless of strategic outcomes, publishers, universities, and funding bodies have developed mutually reinforcing systems that reward publication volume and profit over meaningful scientific progress (6).

In the scientific community, this manifests in several important ways. The pressure to publish may lead researchers to make questionable choices about their use of AI to support scientific research and writing, where they adopt institutional metrics as being representative of their own values (6). In addition, the emphasis on novel findings can discourage crucial replication studies or research on routine clinical challenges that matter deeply to practitioners but may not generate exciting headlines. Again, the use of generative AI to articulate faux novelty in persuasive narratives (8) will influence what kinds of papers are published, as well as raise questions about which agendas are being privileged. And finally, the focus on quantitative publication metrics has blurred the boundary between clinically meaningful research, and research that serves, among other things, a journal's impact factor (7).

These dynamics are sustained by mutually reinforcing incentives across the research ecosystem. Universities evaluate faculty performance based largely on publication counts and journal impact factors. Funding bodies look to publication metrics when making grant decisions. Individual researchers need publications for career advancement, and journal publishers benefit from a steady stream of submissions. Each actor in this system is responding rationally to their incentives, but the collective result is a publishing culture that fails to serve the core mission of advancing scientific knowledge (8).

While there are limitations to the 'industrial complex' analogy (for example, publishers are not intentionally maintaining social and healthcare problems for continued profits), it nonetheless serves as a useful framework to explore the introduction of generative AI into the scientific process. There is already evidence that generative AI will enable researchers to produce papers at unprecedented speed—conducting analyses, drafting manuscripts, and responding to reviewer comments far faster than human researchers can do on their own (9). While this might seem like progress, it risks further divorcing research from careful reflection and clinical relevance. Without thoughtful guardrails, AI could amplify the volume-over-value tendency that the research industrial complex has triggered.

Mitigating the risks: reimagining journals as AI-supported communities

Scientific journals originally emerged as public records of conversations between scholars working on the most difficult problems of their time, serving as forums for ongoing dialogue (10). This original vision of journals as spaces for collaborative discourse stands in stark contrast to their current role as credentialing mechanisms within the research industrial complex. We might instead aim to recapture the original spirit of journals as platforms for scientific discourse, leveraging AI's capabilities to support conversation and dialog rather than using it to produce more papers with less value. The future of scientific publishing lies not in becoming more efficient article-processing platforms but in returning to the original purpose of journals: facilitating learning communities and discourse at the cutting edge of practice.

First, generative AI could help surface meaningful connections between different researchers' work that might otherwise go unnoticed. Instead of accelerating article production, AI might be used by journals and editors to analyze a submitted manuscript's methodology, findings, and theoretical framework to identify relevant ongoing discussions in the journal's community (11). For example, when a researcher submits a paper on a novel healthcare intervention, an AI system could not only flag related published papers but also highlight active discussions in other communities where clinicians are debating similar approaches or connect them with practitioners who have documented case studies in related areas. This shifts the focus from simply adding more to the literature toward joining an existing scholarly conversation, even when that conversation is happening elsewhere. It might also encourage authors and researchers to proactively connect to those existing discussions, embedding their work more effectively within those contexts. However, there is a risk that AI may prioritize surface-level keyword similarities over deeper methodological or theoretical coherence, leading to misleading associations. Editors and subject-matter experts should, therefore, verify AI-suggested connections, ensuring that flagged discussions align with the nuances of the research rather than being based on algorithmic correlations alone.

Second, AI could make peer review more dialogic rather than merely evaluative (or, in some cases, combative). Current large language models excel at asking probing follow-up questions and identifying unstated assumptions, which might help support all parties in a review process. This capability could be used to facilitate structured discussions between authors and reviewers, where the AI helps articulate points of confusion, surfaces potential counterarguments, and suggests areas where additional practitioner perspectives might be valuable as part of a multi-turn, long-context dialogue (12). Instead of reviewers (and, more likely, AI-based review systems) simply judging if a paper meets the publication criteria (13), the review process could facilitate a genuine dialogue about strengthening the work's contribution to practice while being supported by a critical yet constructive language model fine-tuned for peer review. While AI-supported review shows promise, there is nonetheless a concern that its suggestions might lack contextual sensitivity, leading to overly generic or misaligned critiques. There is also a risk that AI might introduce biases by disproportionately reflecting dominant perspectives embedded in its training data. Reviewers should, therefore, critically assess AI-generated feedback, using it as a starting point rather than a definitive judgment.

Third, AI could help make post-publication discourse more focused and productive. Rather than having fragmented discussions across unrelated journals, comment sections, social media, and separate response papers, AI could help organize and synthesize ongoing scholarly conversations about published work in a special section of the journal (14). It could identify key themes in practitioner responses,

highlight emerging consensus or disagreements, and help authors engage systematically with how their work is being interpreted and applied. This maintains the paper as a living document within an active community rather than a static artifact, where the AI-generated content is regenerated and updated in response to new publications and discussions from across the internet. However, we must also recognize that AI-driven content synthesis may inadvertently prioritize high-engagement topics over true scholarly debate, reinforcing existing narratives and failing to accurately capture nuanced disagreements. Editors and moderators should curate AI-generated summaries, ensuring a balanced representation of diverse perspectives. In addition, authors could verify and respond to AI-generated interpretations of their work.

And finally, generative AI's multimodal capabilities offer unique opportunities to make research more accessible and engaging across different contexts and audiences. Rather than limiting research dissemination to traditional PDF formats, journals could use AI to automatically generate alternative presentations of published work—from simplified explanations for practitioners and public audiences (15) to translations in multiple languages (16), to audio versions for listening while otherwise occupied (17), and eventually, video summaries that visualize key concepts and findings (18). This multimodal approach would help break down barriers to accessing scholarly work while enabling researchers to engage with the literature in ways that best suit their needs and preferences. However, the focus should remain on meaningful knowledge translation rather than simply multiplying formats—each alternative presentation should be thoughtfully designed to serve the journal's community and advance scholarly discourse. This reimagining of how research is shared could help journals fulfill their core purpose of facilitating learning and dialogue. While AI-generated summaries, translations, and visualizations can enhance accessibility, there is a risk of over-simplification, misinterpretation, or loss of critical nuance, particularly in technical or controversial subjects. Experts should review AI-generated content before dissemination, ensuring that translations retain accuracy and that generated content does not distort or misrepresent the original intent.

The key to these examples is to think of AI as a support for human-to-human scientific discourse and engagement rather than a means of producing more articles more quickly. This reimagining requires us to change our perspective of what a "journal" is. Rather than maintaining their gatekeeping and repository functions, scientific journals could become more dynamic spaces that foster ongoing dialogue between researchers, clinicians, educators, and society. These spaces would support multiple formats for sharing knowledge, with the aim of enhancing thoughtful human connection and understanding. But most importantly, they would redefine success through evidence of real-world impact rather than superficial citation counts. The value of AI is that it can help process and connect information at scale, enabling researchers to better embed their findings within broader contexts. The role of generative AI in scientific publishing should, therefore, be to support meaningful scholarly dialogue rather than obscure it with an avalanche of AI-generated content that serves only to feed the research industrial complex.

How to implement AI-supported learning communities in journals

The transformation of scientific journals from gatekeepers and content repositories into vibrant knowledge communities requires a fundamental reimagining of editorial roles and processes. This transformation represents not merely an adaptation to technological change but rather a return to journals' original purpose of facilitating learning and discourse in practice. In this section, several interconnected changes that journal editors might consider implementing as part of the journal transformation process are proposed.

Editors might reconceptualize peer review as an ongoing scholarly conversation, which takes as its starting point the practice of post-publication peer review (19). The traditional model of sequential rounds of peer review could be replaced with dynamic community dialogue, where standing review communities include generative AI agents, researchers, and practitioners who engage with manuscripts from submission through publication and beyond (13). Artificial intelligence can also support this transformation by identifying relevant reviewers based on expertise and interests, surfacing meaningful connections between submitted work and existing discussions in the community (12), and facilitating structured conversations by articulating points of confusion and potential counterarguments. This approach transforms peer review from a primarily evaluative process into a collaborative endeavor where AI acts as a mediator and guide, working alongside human reviewers to strengthen both the immediate work and its relevance to the broader scientific discourse.

The scope of publication formats must likewise expand beyond traditional research articles to accommodate a wider range of scholarly communication. Editors can create dedicated spaces for pre-publication discussion of protocols and methodologies, implementation experiences and case studies, practitioner perspectives, and ongoing discussions of published work. Again, AI can support this diversification by generating different versions of content tailored to various audiences while maintaining consistency, creating regularly updated topic-specific synthesis pages, and facilitating knowledge translation across languages and formats. These expanded formats acknowledge that scientific knowledge creation occurs through multiple channels and that different audiences may require different presentations of the same underlying research. This would also move us away from the idea that researchers should be rewarded per unit of publication and that engagement with transformed research findings may be more meaningful than simplistic publication metrics.

The role of editorial boards should also evolve away from primarily managing manuscript flow—which could be managed by dedicated AI agents—to actively cultivating the community. Board members could organize virtual journal clubs and themed discussions to connect researchers with relevant practitioners, educators, students, and other stakeholders, thereby creating opportunities for collaboration and sustained engagement. AI systems can assist by identifying emerging themes within the community that require deeper exploration, generating discussion summaries, connecting

participants with shared interests, and tracking ongoing conversations. This shift positions editorial board members as facilitators of scientific discourse rather than merely arbiters of publication decisions and "finders of peer-reviewers."

Fundamental to this transformation is the development of new impact metrics that better reflect journals' expanded role in the scientific community. Rather than relying primarily on citation counts and other quantitative metrics unrelated to real-world impact, journals should work with new stakeholders to create systems that track more authentic forms of research implementation, for example, changes in practice and community engagement across multiple platforms. Instead of focusing primarily on citation among academics as the principal measure of impact, editors could use AI to analyze a wide range of other signals of real-world engagement, tracking how research findings are influencing practice and identifying patterns in community engagement and implementation. These new metrics would provide a more nuanced and meaningful assessment of journal—and researcher—contribution to scientific progress. This approach would need to address potential challenges, such as the gaming of new metrics and difficulties in standardization across disciplines, and would require transparency in measurement methodologies.

Success in this transformation requires sustained commitment from the existing stakeholders in the scientific publishing ecosystem, as well as new stakeholders, including patients, service users, and members of society. Journal editors can lead the way in implementing these changes, but authors, reviewers, and practitioners must also adapt their approach to scientific communication. Authors and researchers should view publication not as the endpoint of research but as the beginning of a dialogue with their professional communities. Reviewers will need to embrace their role as contributors to ongoing scientific conversations rather than simply being called on to judge the quality of submitted manuscripts. Practitioners should actively engage in discussions about research priorities, methodology, and implementation, bringing their practical experience to bear on both the questions being asked and the ways that findings are translated into practice.

It should also be clear that the transition to AI-supported learning communities in scientific publishing does not necessitate an immediate or complete transformation of all journals. While some publications may choose to fully adopt this model, a more incremental approach is likely to be the most viable path forward. This could involve dedicating specific sections within journals to AI-supported discussions, such as post-publication forums, structured peer engagement spaces, or curated thematic dialogues facilitated by AI. These sections would operate alongside traditional journal functions, allowing for gradual integration and evaluation before broader adoption. By adopting a phased approach, journals can assess the effectiveness of AI-supported interactions while maintaining the integrity of their existing review and publication processes.

The integration of AI tools throughout this transformation must be guided by a clear understanding of their role: to enhance human networks and understanding rather than reinforcing the acceleration of article publication. By thoughtfully implementing these changes, journals and editors can better serve their communities while advancing scientific knowledge and improving clinical outcomes. This evolution represents not just an adaptation to this oncoming technological change but a return to the fundamental purpose of scientific journals as platforms for scientific discourse and professional development.

Navigating the transition to AI-supported learning communities

The transformation of scientific journals into knowledge communities faces significant systemic challenges deeply rooted in what I have been calling the research industrial complex. This interconnected system of incentives, metrics, and institutional practices and norms has created a self-perpetuating cycle that prioritizes publication volume over other, potentially more impactful, practices and activities. The introduction of generative AI into this ecosystem will only reinforce an accelerationist agenda that will quickly overwhelm scientific journals and their existing workflows and processes. Understanding and addressing these systemic constraints is important for any meaningful transformation of scientific publishing.

The most fundamental challenge lies in the deeply entrenched nature of current publication metrics within the broader academic ecosystem and the use of those metrics to inform promotion decisions, grant application success, and institutional reputation. Universities, funding bodies, and promotion committees rely heavily on quantitative metrics like publication count and journal impact factors, creating powerful institutional resistance to change (20). While individual journal editors might embrace the community-centered approaches suggested here, researchers—especially early-career academics—face strong systemic pressures to prioritize traditional publication metrics over meaningful engagement with their scientific communities. This path, reinforced by the introduction of generative AI, will further entrench misaligned incentives that might work against the substantive reform of scientific communication and publication.

Within the current metrics-driven system, authors will be pressured into using AI to accelerate article production and processing, further feeding the "publish or perish" mentality that already distorts academic incentives. Journal editors might respond to these AI advances by simply adapting their workflows to process more papers faster, seeing increased throughput as a competitive advantage relative to other journals. Given other challenges, like finding peer reviewers and managing the increased frequency of submissions, this risks creating an AI-driven paper mill (21) that serves career advancement metrics and publisher revenues while further degrading the quality of scientific discourse. The challenge for journal editors is to resist this pressure and instead harness AI's capabilities to deepen, rather than hasten, professional dialogue.

Overview of the AI-supported publishing model described in this paper

Current publishing system	AI-supported community model
Peer review process	
Primarily evaluative and gatekeeping, with reviewers judging manuscripts against publication criteria in isolation. Often slow, inconsistent, and lacking engagement between authors and reviewers.	AI facilitates dialogic review by identifying points of confusion, surfacing potential counterarguments, and connecting reviewers with appropriate expertise. Review becomes an ongoing scholarly conversation rather than a binary accept/reject decision.
Risks: Reviewing is viewed as a burden; bias and inconsistency in evaluation; limited opportunity for constructive dialogue.	*Risks*: AI suggestions lacking contextual sensitivity; potential to amplify biases from training data; over-reliance on automated feedback.
	Mitigation: Human reviewers critically assess AI-generated feedback, using it as a starting point rather than a definitive judgment. Editorial oversight ensures balanced representation.
Knowledge connections	
Research exists in silos with limited integration across studies, creating fragmentation where related work often goes unconnected.	AI analyses manuscripts to identify meaningful connections to existing work and ongoing discussions, embedding new research within broader contexts and conversations.
Risks: Information overload; researchers unable to keep up with expanding literature; redundant research.	*Risks*: Surface-level keyword matching rather than deeper methodological or theoretical connections; misleading associations.
	Mitigation: Editors and subject-matter experts verify AI-suggested connections, ensuring that flagged discussions align with research nuances.
Post-publication discourse	
Fragmented discussions across unrelated journals, comment sections, and social media. Limited engagement with published work after publication.	AI organizes and synthesizes ongoing scholarly conversations, identifies key themes in responses, and helps maintain papers as living documents within active communities.
Risks: Research treated as static artifacts; difficult to track impact beyond citations; limited practitioner engagement.	*Risks*: AI prioritizing high-engagement topics over scholarly debate, reinforcing existing narratives, and failing to capture nuanced disagreements.
	Mitigation: Editors curate AI-generated summaries to ensure balanced representation; authors verify and respond to AI-generated interpretations of their work.
Knowledge translation	
Research dissemination is limited to traditional PDF formats inaccessible to practitioners and public audiences.	AI generates alternative presentations tailored to different audiences - from simplified explanations to translations, audio versions, and visual summaries.
Risks: Research impact is limited by accessibility barriers and the disconnect between research and practice.	*Risks*: Oversimplification, misinterpretation, loss of critical nuance in technical or controversial subjects.
	Mitigation: Expert review of AI-generated content before dissemination, ensuring translations retain accuracy and don't misrepresent original intent.
Impact measurement	
Reliance on citation counts and journal impact factors, incentivizing quantity over quality and meaningful impact.	AI analyses multiple signals of real-world engagement and implementation, tracking how findings influence practice beyond academic citations.
Risks: Publication for career advancement rather than scientific progress, "salami slicing" of research, misaligned incentives.	*Risks*: Gaming of new metrics, difficulty standardizing impact measures across disciplines, resistance from established institutions.
	Mitigation: Multiple complementary metrics developed with stakeholder input; transparency in measurement methodologies; gradual transition to new evaluation standards.

The current publishing system generates significant revenue through traditional article processing charges and subscription models, creating financial disincentives for fundamental change. Maintaining active knowledge communities requires more sustained investment than simply processing manuscripts, yet traditional funding models do not currently support this shift. While AI could help manage some aspects of community engagement more efficiently, a

transition period would require significant investment in new infrastructure and processes, and individual researchers or journals attempting to break free from traditional metrics-driven publishing face significant risks.

However, there is hope. Forward-thinking editors and publishers could better harness the intellectual work of scientific publication that is currently freely given by engaged academics. Instead of volunteering their time for peer review in a model that serves mainly to increase the profit margins of already wealthy publishers, academics may be more likely to seek out opportunities to grow and develop as part of these new communities of learning centered around scientific journals.

This transformation is further complicated by the collective action problem - while most stakeholders might agree that the current system is sub-optimal (or actively harmful), no individual researcher, journal, or institution can safely step away from traditional metrics and publication practices while everyone else continues to use them. A researcher who focuses on 'building community' rather than increasing their publication rate risks being denied promotion. A journal that slows down to emphasize thoughtful discourse might see submissions decline. And universities that ignore traditional metrics could find themselves dropping in institutional rankings. Making meaningful change, therefore, requires coordinated action across multiple stakeholders, who must be willing to accept short-term costs for long-term systemic benefits. This coordination challenge helps explain why many previous attempts at reform have struggled to gain traction despite widespread recognition of the system's flaws. And while the system remains largely unchanged, I see the potential for generative AI to act as a forcing function.

Throughout all these challenges, the central question remains: how does the scientific community ensure that any reforms influenced by the integration of generative AI serve to enhance rather than merely accelerate scientific discourse? The answer lies in consistently returning to the core purpose of journals, which is to advance scientific knowledge and improve practice through thoughtful research and professional dialogue. This requires actively resisting the pressures of the research industrial complex while building new, AI-supported systems that better serve the needs of scientific communities and the broader areas of society they serve.

Conclusion

The rise of generative AI marks a critical juncture for scientific publishing. While AI could accelerate existing problems within the research industrial complex by enabling ever-faster article production, it also presents an opportunity to fundamentally reimagine scientific journals and the communities they serve. Rather than using AI to simply process more papers more quickly, we can use these technologies to transform journals from metrics-driven repositories of content into vibrant communities that facilitate meaningful discourse and collaborative learning. This transformation will require coordinated action across the scientific ecosystem, with authors, journals, institutions, and funding bodies working together to prioritize genuine scholarly dialogue over publication counts. The future of scientific publishing lies not in using AI to accelerate publication but in supporting the kind of thoughtful, community-driven discourse that advances both knowledge and practice.

This transformation may seem idealistic in the face of entrenched institutional incentives, but the alternative is to passively accept a system that prioritizes metrics over meaning. Rather than viewing these challenges as insurmountable, we should see them as an opportunity to deliberately shape the future of scientific discourse. By taking intentional steps to create an AI-supported publishing ecosystem that genuinely advances knowledge creation, we position ourselves as active architects of scientific progress rather than passive participants in an increasingly accelerated research industrial complex. This transformation will require coordinated action across the scientific ecosystem, with authors, journals, institutions, and funding bodies working together to prioritize genuine scholarly dialogue over publication counts. The future of scientific publishing lies not in using AI to accelerate publication but in supporting the kind of thoughtful, community-driven discourse that advances both knowledge and practice.

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