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Strengthening Trust and Transparency in Scholarly Publishing: Pillars for the Future

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ABSTRACT
In recent years, concerns about reproducibility, opaque editorial processes, and financial complexity have increasingly challenged the credibility of scholarly publishing. This paper examines the essential roles of trust and transparency in the evolving landscape of scholarly publishing. It highlights how systemic challenges, such as irreproducibility, opaque editorial workflows, and financial complexities, have eroded confidence in research outputs. To address these deficits, the paper outlines several key "pillars," including open data, transparent peer review, and accountable editorial policies. Furthermore, it discusses the impact of emerging technologies like AI and the necessity for global equity to ensure inclusivity for researchers in resource-constrained regions. The urgency for these reforms is even greater now, given that data suggests that as many as 90% of published research findings could be unreproducible, thereby contributing to the reduction in discoveries and resulting in a substantial waste of global resources. This paper also calls for coordinated governance and independent oversight as a means to restore integrity and assure continued trustworthiness of scholarly communication as a means for advancing scientific knowledge.

KEYWORDS
Trust, transparency, scholarly publishing, reproducibility, open data, peer review, research integrity

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INTRODUCTION

Building and maintaining trust across all communities is critical to academic publishing as it relates to creating and sharing research. As a result of recognized differences in readiness for community and peer review, there is a significant lack of trust in the current environment. Research reproducibility and credibility are also at risk because many researchers are unable to independently verify their results. Additionally, there are few mechanisms in place that allow for formally assessing the rigor of research. The consequence of these issues affects research scholars, research funders and the general public, and is largely a result of structural issues such as opaque editorial processes and inefficiencies.

In order to deal with these issues, the research community needs to agree on common principles that underlie trustworthy research practices. Transparency means making the entirety of research records available to the public; this includes all data, methods used to carry out the research, and the decision-making processes that were employed throughout the research. Integrity is about conducting research according to ethical standards; ethics is characterized by honesty and rigor in the generation of scholarly

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outputs. Governance refers to the framework (including structures, standards, and accountability mechanisms) that creates a sense of ethical behavior by institutions and provides a means of holding them accountable for their actions. Collectively, these principles represent the essential basis from which trust and credibility can be developed in the area of scholarly publishing[1].

Trusted transparency facilitates reproducibility by providing the materials required for verifying findings. While complications arise from the tension between distribution and data access, recent guidelines have begun bolstering these values. This paper provides a roadmap for reform by examining the implications of trust deficits, identifying the key "pillars" of transparency, including open data and transparent peer review, and advocating for coordinated governance to ensure scholarly communication remains a reliable foundation for science.

RATIONALE AND SCOPE

In scholarly publishing, there is an urgent need for trust and transparency because there are many people who believe there are problems with how people communicate about research, as well as the declining reliability of research. The primary problem is that many studies are frequently irreproducible or cannot be verified. Increasing the rate at which studies are published has contributed to this problem because there has been a surge of preprints. While preprints may be shared without the proportional use of data sets and code, this does not provide the basis for validating the study. Trust and transparency in research require confidence in widely accepted standards for sharing and making the process of making decisions public, so that the process of making decisions is fair throughout the world.

Areas of integration: The study encompasses the following three areas of integration:

- **Policy:** The establishment of research foundations and their respective universities, to provide guidelines/expectations for researchers regarding how to publish preprints, data sets, and adhere to journal standards
- **Technology:** The implementation of technical solutions to support researchers in complying with publishing standards, such as the use of containerized workflows and trusted archives
- **Governance:** The establishment of formal mechanisms to ensure integrity, reproducibility, and institutional responsibility in assessing the reliability of research

By establishing the relationships between the three areas described above, this article provides the basis for a comprehensive framework for assessing compliance with global standards for funding and publishing.

DEFINITIONAL FOUNDATIONS OF TRUST AND TRANSPARENCY

Trust is fundamental to the healthy functioning of society and must be established within scholarly publishing through reliable research outputs, rigorous review processes, and transparent publication channels. Transparency acts as a catalyst for trust by enabling researchers to evaluate the integrity of research records and the robustness of governance processes. While often used interchangeably, transparency and accountability serve distinct roles: transparency focuses on the provision of relevant information, whereas accountability involves the judgment of actions by third parties[2].

To clarify these relationships, Table 1 outlines the distinctions between the three pillars:

Table 1: Distinguishing trust, transparency, and accountability

Concept	Primary focus	Role in publishing
Transparency	Provision of information	Providing access to data, code, and review process information
Accountability	Judgment of actions	Ensuring research conduct is evaluated by third parties or independent oversight
Trust	Confidence in the system	Establishing faith in research outputs and editorial integrity

IMPLICATIONS OF TRUST DEFICITS IN SCHOLARLY PUBLISHING

Publishing aims to promote transparency in science, yet independent result reproduction is often obstructed by inaccessible data and methods. There are transparency issues throughout the editorial and peer-review processes, raising concerns about bias related to previous publications, conflicts of interest, and funding influences. Financial aspects like article-processing charges (APCs) are rarely disclosed during acceptance or publication notifications[3] Scholarly publishing reform should consider existing work, with progress likely being incremental and cautious regarding operational, ethical, and legal challenges. Successful strategies from open-data initiatives and peer-review advancements could inspire change, while ensuring equitable access to funding, training, and resources becomes crucial for diverse contexts, supported by multilingual policy explanations for better inclusivity[4].

Reproducibility and verification challenges: Reproducibility is a cornerstone of scientific research. However, estimates indicate that 50-90% of published studies may not be reproducible, leading to wasted resources and slowed scientific progress[1,5]. Many high-impact journal articles fail replication tests, highlighting the difficulty in independently verifying research findings. Validation of studies often depends on the availability of experts and testing resources, yet a lack of automation and standardized policies for code and data sharing further impedes verification[6]. To address these challenges, journals and researchers are increasingly encouraged to provide open access to data, source code, and version-controlled datasets, alongside containerized workflows, which allow replication in identical computational environments. These measures enhance transparency, enable verification, and help mitigate the ongoing reproducibility crisis.

Editorial integrity and peer review concerns: Trust deficits in scholarly publishing are closely linked to editorial integrity and peer-review processes. Biases, conflicts of interest, and opaque decision-making can undermine confidence in research evaluation[7]. To enhance transparency, journals should clearly disclose review criteria, timelines, and acceptance policies, specifying whether peer review is single-blind, double-blind, or open. Transparent communication of reviewer reports, editorial decisions, and conflicts of interest can reduce the risk of partiality or undue influence, fostering a fair and accountable publishing environment. By implementing clear policies and accessible reporting, publishers can strengthen trust in both the evaluation process and the veracity of published findings.

Financial and access-related opacity: The financial aspect of the academic publishing field is convoluted and naively opaque due in part to the many shifts in the industry. These issues also create a barrier to the evidence-based development of policies that are effective for the evolving academic publishing landscape. Thus, there is currently no clear understanding of what the impact of financial changes will be on the future of publishing for both scholars and institutions. Therefore, administrators and faculty will find it difficult to plan for the future and evaluate how their budget allocations have affected their ability to effectively communicate their scholarly output[8].

Publishers are providing some assistance with these issues by providing greater clarity on their financial operations through a variety of different financial frameworks. For example, the Public Library of Science (PLOS) provides information on how their Article Processing Charges (APC) are used for various costs associated with editorial management of the accepted articles as well as publishing through a peer-review process, technology infrastructure costs, etc.[9]. In addition, other initiatives such as the Open APC project allow for institutions to publicly disclose their expenditures on publications enabling them to compare their relative performance across institutions and helping to create a more competitive and transparent

marketplace. However, the continued barrier to transparency in the printing and digital publishing marketplace because of confidentiality clauses or other contractual obligations associated with the majority of subscription contracts with the major publishing companies creates a significant gap between the two entities in terms of providing clear financial information to assist in making informed decisions.

PILLARS OF TRUST AND TRANSPARENCY

Several fundamental principles must be incorporated into the publishing process to improve the credibility and trustworthiness of academic research. Once these have been categorized into clearer pillars, it will be easier for journals to implement them and for the community to verify their implementation.

Data and methods: Making the underlying data and methods available enables the community to verify, reproduce or otherwise build on the research. This is the single best defence against the "reproducibility crisis".

Transparent peer review: Putting review reports, communications between authors, editors, and reviewers, and final decisions into the public domain enhances confidence in the integrity of the editorial process. Making clear whether the paper was subjected to peer review, and the nature of the peer review (single-blind, double-blind, etc.) reduces the likelihood of the "tyranny of the reviewer"[10].

Editorial policy accountability: Journals should publish transparent, detailed policies regarding the editorial process which specify timelines for submission, review, and of publication. Furthermore, eligibility and acceptance criteria should be specified.

Transparency of financial and ethical interests: Journals publish a clear statement of funding from a third party and manage conflicts of interest to the extent possible, in order to ensure that no research is unduly influenced by an undisclosed bias that is commercial or personal in nature.

Reproducible workflows: Using containerized tools (such as Docker) allows others to run the authors' analysis code in an identical environment. Together with using version-controlled datasets in trusted repositories, this creates the foundation from which the results can be replicated with a high degree of accuracy[11-13].

OPEN DATA AND OPEN METHODS

In scholarly publishing, access to data and methods is crucial for verifying research findings and addressing the reproducibility crisis. Enhanced transparency mitigates the "tyranny of the reviewer" and prevents misuse of publicly funded research. Consequently, real reproducibility and comprehension of studies remain challenging. Reproducible research relies on transparent and extensive documentation of all investigations post-initial proposal, enabling checks by other researchers[14]. This transparency broadens understanding, while reproducibility, a more rigorous goal, follows once transparency is established. Further guidance for enhancing reproducibility in social science research can be accessed via the Open Science Framework[15].

GOVERNANCE, STANDARDS, AND ACCOUNTABILITY

Effective governance and standards are vital for fostering trust and transparency in scholarly publishing. Certification and public recognition of practices boost trust among stakeholders and increase accountability[16]. Referring to the widespread acknowledgment of research reproducibility crises, the scholarly community has overall called for intensified efforts at providing open data sets and methods to make science more transparent[17]. Research data, methods, and code produced in the service of scholarly publishing occupy an especially important position as they may be required for the validation of formal claims. Minimum data sets, agreed-upon data exchange protocols, and metadata journal guidelines for such data accompany the broader calls to improve the timeliness and efficiency of information dissemination.

INCENTIVES, RISKS, AND IMPLEMENTATION PATHWAYS

Restoring trust in scholarly publishing is crucial for the health and effectiveness of the research ecosystem. Strengthening trust allows researchers to evaluate findings and their applicability, enhancing the integrity of knowledge. Transparency supports trust by ensuring openness regarding datasets, code availability, and sharing of substantial materials and processes. It involves clear peer review and editorial practices, detailing reviewer and author roles, conflicts of interest, and decision criteria. Additionally, transparency is linked to accessibility, verifiability, and auditability[18]. By reinforcing trust and transparency, the research enterprise benefits significantly, enabling researchers to discover, apply, build upon, and share knowledge effectively. Each research effort relies on previous contributions, making transparency in publication essential for strengthening the role of research outputs in the broader context[19,20].

CASE STUDIES AND BENCHMARKS

Over the last decade there has been a noticeable increase in faith that the research sector is undergoing better changes due to an increased number of researchers engaging in practices such as data sharing combined with open peer review initiatives, coupled by various types of specialized data platforms that improve the performance of editorial processes, resulting in more reliable and reproducible outcomes.

Transparency after submitting your work: Systems like Research Square and F1000Research are creating models in which the transparency is available right away after papers have been submitted. Specifically, F1000Research uses a repository (or hosting) model that offers immediate publication of research and provides access to all elements related to the peer-review process, including reporting from review(s) and responses from the authors.

Rapid sharing of early data: Preprint repositories (for example, arXiv and bioRxiv) have made it relatively easy for researchers to rapidly distribute data. They also offer ways to solicit feedback from fellow researchers and respond to criticism to improve upon their research prior to submitting it to a peer-reviewed journal.

Increasingly, institutions are implementing open-review processes: Publishers including Elsevier and Springer Nature are being incentivized to increase the number of transparent peer-review programs within their peer-reviewed journals. Most recently, Nature has made transparent peer review a standard procedure for all primary research articles, with the report(s) from reviewers included with the final published version of the article, resulting in more clarity into the peer-review process[12,13].

These transparency initiatives target survey results which reveal that research replication is frequently weaker than considered earlier. By providing easier access to both reviewer reports and decision letters, the platforms could deliver the independent corroboration upon which the scholarly community relies for establishing and sustaining trust in it.

GLOBAL AND EQUITY CONSIDERATIONS

Scholarly publishing is an international activity; however, researchers globally continually confront profound challenges with respect to the availability of resources and the means to engage in the process of publishing, with many of the issues they face being influenced by socio-economic and geographic factors. In order to promote a truly transparent scholarly publishing ecosystem, the scholarly publishing community must focus on two key areas where inequity exists.

Resource-based barriers: Many scholars (especially from the Global South) face significant barriers because of very limited resources (e.g., limited access to high-cost subscription journals, lack of funding to pay Article Processing Charges [APCs], and lack of sufficient technology infrastructure to support data-intensive research). Providing equitable access to resources (e.g., fee waivers, institutional support of open-access repositories) is essential to ensure that these scholars can be part of the global scientific conversation[21].

Linguistic and technical gaps: The linguistics and technical divide: across the world today, more and more researchers have a difficult time accessing research due to how researchers communicate via language. Despite there being multiple languages used to communicate via research across science, english, as the main language for science, has the monopoly on scholarly communication. However, researchers in countries that are not in the English-speaking world often face obstacles in their country's language policies or by not being able to obtain permission to publish.

Multilingual outreach: Multilingual engagement is currently being introduced to the public by a number of scholars, including some in fields such as anthropology, in order to reach non-scholarly audiences, as well as an extended community of language specialists in smaller universities.

Support mechanisms: An increasing amount of resources including open-access websites, multilingual training in accessing, supporting, and disseminating scientific research have been implemented on platforms designed to assist researchers from many different disciplines with the aim of providing multiple avenues for accessing knowledge and research so that language is not a hindrance to sharing high-quality research with a wide audience[22,23].

National policies to promote open access and provide a more comprehensive and representative system for the advancing of science through global scholarly communication efforts can help to narrow these gaps between scientists and the general public[24,25].

EVALUATION AND IMPACT MEASUREMENT

Key trust "pillars" involve publishers' openness regarding data sharing, content reuse, and authorship, along with transparency about editorial practices, author contributions, conflicts of interest, and funding[20]. Additionally, external and independent oversight serves as governance pillars, ensuring trustworthiness and promoting transparency. Researchers advocate for publishers to make submissions and feedback accessible to enhance accountability[26-28].

Metrics for trust and transparency: Multiple studies suggest metrics to assess trustworthiness and transparency in scholarly journals. These metrics address the complex nature of trust and transparency, aiming to strengthen accountability and ethical values like honesty and rigour[14]. Researchers, funders, institutions, and publishers all have obligations that can benefit from research advances being open to scrutiny and replication[10,21,29].

POLICY IMPLICATIONS AND STAKEHOLDER ROLES

Globally, stakeholders in scholarly publishing share ownership and have an ethical duty to uphold good scholarly practices[30]. Collective action is needed to protect public interest in research conduct and publication. Trust is critically needed, especially with the rise of AI technologies affecting transparency and core values[31]. The integrity of research is at risk with potential fabrication of papers through AI and unchecked misinformation. Strengthening transparency in scholarly publishing is essential to maintain research integrity during this vulnerable and transformative period.

CONCLUSION

Trust is the foundation of confidence in scientific activity, and it is critical to the integrity, validity, and reproducibility of the world's scientific record. Transparency is one way to engender trust by providing access to data and methods as well as about how editorials are determined. By creating a global research community that is transparently engaged with its members, it can help spur scientific advancement so that it benefits all people; transparency also creates an environment where there are fewer opportunities for

fraudulent behavior, allowing for other independent people to verify a particular research result. In order to achieve a high level of trust, the three components that build trust must be utilized as key components of the research process: open data, transparent peer review, and reproducible containerized workflows rather than viewed as optional elements of the research activities. Furthermore, coordinated governance and independent oversight mechanisms must be utilized to ensure that all persons involved in the academic community understand the financial flow and editorial processes used in the research. Equitable inclusivity should also be encouraged in order to provide an opportunity for Global South researchers to participate in transparent academic communication and eliminate resource and language challenges. Finally, increasing transparency and trust is not just a technological challenge; it is a shared responsibility of all institutions and stakeholders involved in academic publishing, and by employing these principles, the integrity of academic publishing will continue to be a strong foundation for scientific discoveries in the future.

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