

Preprints: Boon or Bane?

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This essay addresses preprints, their advantages and disadvantages, the degree of public acceptance, and global promotional campaigns. It also focuses on dubious preprint servers as a source of scientific misinformation. It concludes with a cautionary note about the scenario in India.

The basic principle of academic science is that the results of the research must be made public. Whatever scientists think or say individually, their discoveries cannot be regarded as belonging to scientific knowledge until they have been reported to the world and put on permanent record. The fundamental social institution of science is thus its system of communication. Prof. John Ziman

The academic journal has been a popular and reliable channel for the communication of scientific knowledge since the 16th century. This reliability can be attributed to editorial rites and a peer-review process that verifies raw data, methods used, results obtained, and references. As a result, the period between paper submission and publication in a legitimate scientific journal could often range from four to twelve months. Some discoveries of great importance need immediate publication. However, the peer-review procedure hinders the speed of the dissemination process. This delay is criticized because the researcher is worried about priority and the possibility of being scooped. According to Smith Richard, "*peer review is slow, expensive, profligate of academic time, highly subjective, something of a lottery, prone to bias, and easily abused*" (Smith, 2006). To address the time gap and circumvent the inadequacies of the peer review system, the "Preprints" model was developed in which the research article circulates *without* the peer review process.

This article addresses preprints, their advantages and disadvantages, the degree of public acceptance, and global promotional campaigns. It also focuses on dubious preprint servers as a source of scientific misinformation. It concludes with a cautionary note about the scenario in India.

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What are preprints?

The Committee on Publication Ethics (COPE) defined preprint as “a scholarly manuscript posted by the author(s) in an openly accessible platform, usually before the peer-review process. In other words, preprints are the electronic version of the paper before it is submitted to any scholarly journal.

The first preprint server, arXiv was established at Los Alamos National Laboratory in New Mexico by Paul Ginsparg, the renowned pioneer of the Open Access movement in the 1990s (Ginsparg, 2011). Currently, it hosts nearly two million scholarly articles from physics, mathematics, computer science, quantitative biology, quantitative finance, statistics, electrical engineering and systems science, and economics. ASAPbio maintains a list of archives on disciplines like agriculture, arts and humanities, social sciences, biomedical, and environmental sciences. It states the name of the archive, ownership, disciplines, preservation criteria, and the screening process. Most popular preprint archives are bioRxiv, ChemRxiv, MedRxiv, Faculty 1000, preprints.org, etc.

The preprint can be uploaded to the server and made public the very next day. However, each preprint server has guidelines that researchers should follow before uploading their papers. For example, instructions to authors by preprints.org are available at https://www.preprints.org/instructions_for_authors. A quick checklist is as follows:

- All necessary copyright permissions should be obtained.
- The paper should not contain any plagiarized or objectionable information.
- The paper should not contain any plagiarized or offensive information.
- Check the policies of the journals that accept preprints.
- Research data should be made available to the public.
- All authors should agree to preprints
- The uploaded paper remains permanent on the server.

Preprint archives are frequently in the news due to their openness and lack of a peer-review process. This paper summarizes a few of the pros and cons (also see Bourne et al., 2017; Elmore, 2018; Sheldon, 2018; Fry, et.al., 2019).

Advantages

1. Anyone anywhere in the world can instantly access the work.
2. Authors may receive feedback and comments on their work, which can assist them in improving their manuscript.
3. The authors retain the rights to their work.
4. All uploaded papers receive an un-editable timestamp showing the date and time of upload. The "date stamp" preserves the paper's history and authenticity.
5. Access to research findings is immediate and unrestricted.
6. Journal reviewers will find it easier to choose an article based on public feedback.
7. Digital Object Identifier (DOI) allotted to each preprint enables it to be citable.

8. Preprints can assist in grant applications.
9. Visibility for research in the form of citations.
10. Plagiarism is easily detectable due to the date stamp.
11. Protection from scooping by publishers.

Disadvantages

1. Because of a lack of peer review, there is no guarantee of the accuracy of the data, analysis, or even results.
2. Not all scholarly journals have accepted the preprint system yet.
3. The studies may be scientifically correct, but they lack innovation.
4. Anxiety among researchers that their work may be stolen or duplicated
5. In the media, less scientific and weak preprints may be over-referenced, whereas a significant study may be ignored. This may lead to misinformation.
6. Not all grants providers accept preprints.
7. Not all journal provides a link to the preprint with the published paper.

Publishers and preprints

Publishers have established policies for accepting papers submitted to preprint servers. Major publishers like Elsevier, Nature, PLOS, and Oxford University Press, according to Anderson (2020), all accept preprints from BiorXiv. The Sherpa / Romeo initiative, United Kingdom aggregates open-access policies of more than 5000 publishers. ASAPbio offers a comprehensive overview of preprints, including their definition, submission guidelines, scooping protection, and others Other publishers, such as EMBO Press, Wiley, Plos, etc. have introduced scooping protection.

A Word of caution

Dubious preprint archives: Like predatory publishers, predatory preprint servers have emerged and are difficult to access through Google because of their non-retrievable mechanism. Predatory preprint archive in Chemistry which "chemical and engineering news" is reported the difference between original ChemRxiv and dubious ChemArxiv. Andrew Moore (2020) emphasized fraudulent paper mills that distribute thousands of machine-generated papers. Seifert (2021) defined paper mills as follows:

Paper mills are commercially motivated malicious enterprises operated by knowledgeable "scientists" that produce custom-designed papers containing no real scientific data but only fake data. Depending on the amount of money the customer is willing to pay, paper mills also offer manuscript submission and manuscript revision services and take care of all correspondence with the journal (full-service premium package).

Several plagiarized papers from such paper mills have been uploaded to questionable pre-print servers. These papers are difficult to retrieve from the Internet.

Media and journalists: It is harmful to society to disseminate information through any media without checking the credibility and legitimacy of the preprint. According to Tom Sheldon (2018), Journalists usually spend hours interviewing researchers before publishing a breakthrough scientific discovery. Bad preprints may get lots of attention, while good work would go unnoticed. This may lead to public misunderstanding.

Pre-prints in a pandemic: During the Covid-19 pandemic, a large number of papers were published in journals and also uploaded to preprint servers, particularly in the field of biomedical sciences. As stated by Jessica Polka, executive director of ASAPbio (Accelerating Science and Publication in Biology) preprints were a great boon during the pandemic (<https://www.the-scientist.com/news-opinion/a-surge-in-pandemic-research-shines-a-spotlight-on-preprints-69170>). Andre Moore, on the other hand, has cautioned the academic community about paper mills.

The Indian scenario

Attempts are underway to develop preprint servers in India. IndiaRxiv, which was launched in August 2019 has not gained popularity since many researchers are unaware of the benefits of preprints. According to Gautam Sridhar, a plant scientist at the Indian Agricultural Research Institute in New Delhi, many Indian journals still do not accept papers uploaded on a preprint server. Researchers are likewise unaware of AgriRxiv. Then there is the inadequate funding to sustain preprint servers. There is also a lack of training and sensitization about preprints among Indian scholars (<https://www.nature.com/articles/d41586-019-01082-0>).

Conclusion

Overall, preprints have a noticeable impact on traditional publishing processes. Given the pros and cons of preprints, some publishers and funding agencies have modified their policies to accept papers and encourage academics to publish in preprints that can be used for grant applications. Most importantly, researchers should be aware that publishing an article to preprint servers is the first line of defence against plagiarism, dishonesty, and data fabrication. The research community should decide whether they are researching for the societal benefit or personal gain.

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