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PREPRINTS

BACKGROUND/CONTEXT

A preprint is a scholarly manuscript posted by the author(s) in an openly accessible platform, usually before or in parallel with the peer review process. While the sharing of manuscripts via preprint platforms has been common in some disciplines (such as physics and mathematics) for many years, uptake in other disciplines traditionally had been low, possibly influenced by differences in research culture and strong opposition by some journal publishers [1]. The landscape has evolved rapidly in other fields in recent years, however, thanks to the launch of additional, discipline-specific preprint platforms and increased support by funders and initiatives such as **ASAPBio** [2, 3].

WHY USE PREPRINTS?

Preprint servers provide researchers with a platform to disseminate their work quickly and broadly, in a shorter timeframe than that needed at a peer-reviewed journal. Researchers can establish precedence and may be able to obtain feedback before (or, sometimes, in parallel with) peer review at a journal and from a wider audience than the two or three reviewers traditionally involved in reviewing manuscripts. The availability of preprints can also facilitate interactions between researchers working on similar areas or projects, and may help foster collaboration between groups. Some funders allow inclusion of preprints in grant applications [4] and thus, posting work as a preprint can help authors to provide evidence of research productivity.

Preprint platforms do not currently incur submission fees and, thus, provide a free service to both authors and readers. The long-term sustainability of this business model is an open question, although some feel that the operational costs can be offset via grants and partnerships with other parties [5].

Some preprint platforms provide features where readers can publicly log comments, critiques and suggestions. Even if commenting features are not available, readers can contact the researchers directly. Authors may then use the feedback from the preprint posting to revise their manuscript before submission to a journal, or in addition to the reviewer comments from traditional peer review.

From an editor's perspective, preprint platforms can also provide opportunities to scout upcoming work and invite the submission of suitable manuscripts to their journal. Preprint servers and journals may also enter partnerships to facilitate easy submission of preprint papers to a participating journal; **bioRxiv** is a recent example of a preprint server entering such a scheme with some journals to facilitate the direct transfer of papers posted as a preprint on their server.

CHALLENGES

Some researchers fear that their work may be **'scooped'** if they post manuscripts to a preprint platform, but the prevalence of intentional **'scooping'** and whether or not it differs from situations that arise during journal peer review is unclear [6].

Another important element for consideration relates to the licensing of the material. A preprint platform may require authors to post the manuscript under a particular license, which may conflict with the license or copyright transfer agreements that may ultimately be required by a journal where the author intends to publish the work. Licensing is also a consideration in situations where a researcher may wish to self-archive the paper via a preprint platform after having published the work in a peer-reviewed journal.

Manuscripts submitted to preprint servers do not undergo much, if any, screening prior to being posted. Some preprint platforms perform some basic screening to prevent inappropriate material from being posted (e.g. papers containing libellous or defamatory material), but the level and timing of screening varies from one platform to another.

Currently, there are also no industry-wide standards for how to handle preprints once a major concern is identified about content, methods or reporting in a published article. Some preprint platforms such as **preprints.org** note that preprints cannot be removed except in exceptional circumstances involving misconduct or legal concerns [7], but other servers may allow removal of content at the author's request.

Some critics have raised concerns that preprints may have a negative impact on the credibility and public perception towards research, since the information has not been scrutinised and validated via peer review. For example, what are the risks if a preprint with a potential impact on public health is interpreted by some as established evidence?

ETHICAL QUESTIONS FOR JOURNAL EDITORS

The growing availability of preprints poses a number of questions for journal editors and for the editorial process involving peer review:

Are preprints publications?

The views on this vary among disciplines, journals, and editors, but in general, preprints are not considered prior publication in a way that would prevent later publication after peer review in a journal. However, they share a number of features with journal articles; for example, they report content in scope and format that may be similar to that submitted to journals, and many platforms assign **Digital Object Identifiers (DOIs)** to preprints and will send the preprints for indexing in services such as **Google Scholar** [8].

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Do preprints establish precedence?

Again, this varies among disciplines, journals, and editors, but in general, preprints are considered to establish precedence. Because of this, it is relevant for authors to cite other preprints of which they are aware and that they have considered during their research or are relevant to their work (in line with the expectation that other, non peer-reviewed sources such as datasets, blogs or books would also be cited, although different opinions have been raised as to whether preprint papers and other non-reviewed material should allowed as part of the reference list in journal publications [9]).

In a similar manner and for full transparency, authors should always disclose to journals if they have previously posted the work they are submitting to a preprint platform.

What happens to the preprint if the work is subsequently published in a journal?

This varies among platforms, but in general, the paper will remain on the preprint platform in perpetuity. For transparency and to ensure that readers are aware of the latest status of the work reported, there are benefits to linking the published article to the preprint version, and vice versa. A clear framework has yet to be established on how to handle such linking, but one is in development by **CrossRef** [10].

In addition, a clear guideline has yet to be established on how to handle a preprint if a concern is to arise about the version published in a journal. While standards exist for correcting the published record -- including those provided by **COPE** -- questions remain about if and how linked preprints should be updated. Again for transparency and to ensure that readers are aware of the latest status of the work reported, there are benefits to linking the published article to the preprint version, and vice versa.

Can papers be posted on multiple preprint platforms?

While journals will not consider work currently under review elsewhere, for many disciplines clear guidelines have not yet been established on posting papers to multiple preprint platforms simultaneously. Given that one motivation for posting preprints is to attract feedback from peers, some researchers may be interested in posting the same preprint on different platforms aimed at different audiences. This practice is currently uncommon and it appears to be tolerated as most preprint platforms do not have explicit restrictions against it, but this may change if the practice becomes more common or if preprint platforms start consistently assigning **DOIs** and sending preprints for indexing, which could lead to multiple, and potentially confusing, entries for the same content.

What are the license implications of posting on a preprint platform?

Preprint platforms make the work publicly available under a variety of license types. Authors looking to submit their preprint to a journal should check the license type required by the preprint platform to ensure it will be compatible with their target journal, and vice versa.

RECOMMENDATIONS

Transparency is key, so **COPE** guidance is to develop policies and make these clearly and publicly available in appropriate places, such as author guidelines.

For Journals

First, journal editors should determine whether or not they will consider work previously posted to a preprint platform, taking into account the publishing landscape in the journal's discipline. If the journal will consider work previously posted on a preprint platform, any restrictions should also be determined; for example, must the preprint have been posted prior to journal submission or is simultaneous posting to a preprint platform and journal submission acceptable? Would journal editors allow posting of versions revised during peer review or following acceptance on a preprint server, or only the version initially submitted? All editorial policies outlining the journals' position on preprints should be posted and made publicly available.

For transparency, journals should also outline an expectation that authors will declare any relevant preprint copies of the work on submission. Journals should accept citation of preprint papers in journal submissions, and the reference format should make clear the preprint and non peer-reviewed status of the source. Journals should also decide whether or not to consider comments posted on preprint servers before and/or during the peer-review process; if so, standard formats and mechanisms should be established as to how these will be considered during the peer-review process.

In situations where the journal operates a double-blind review process (i.e., where the identity of the authors is not shared with the reviewers, and vice versa), the availability of a preprint could compromise the authors' anonymity, so journals may wish to acknowledge this. Nevertheless, publishing preprints under a pseudonym is discouraged for transparency and to ensure accountability -- as is the case with journal submissions.

If the journal has existing policies and/or procedures in place regarding media coverage of their publications, they may also need to consider how these are impacted by the availability of a preprint describing the work.

As the preprint landscape continues to evolve, journals may also wish to raise awareness of preprints among their editorial teams, authors, reviewers, and readers via editorials, webinars, etc. Clear policies in author and reviewer guidelines will not only clarify expectations but also provide a framework for handling submissions consistently.

For Publishers

Linking preprints to published articles is becoming as important as linking corrections to peer-reviewed publications. While a standard has yet to be established, **CrossRef** currently accepts registration of preprints and provides services to allow persistent links over time [10].

As part of its **Core Practices** [11], **COPE** expects publishers to have clear policies on the copyright and license requirements that apply for publication in their journals. Such policies are increasingly important in the context of preprints.

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For Preprint Platforms

All preprint platforms should clearly indicate that papers posted have not undergone peer review on their site prior to posting.

The level of screening prior to posting papers varies from one preprint platform to another, and it is important to clearly designate what checks were carried out, and when. Preprint platforms should clearly define and make publicly available their requirements regarding disclosures associated with the work (for example, regarding competing interests), as well as any ethical expectations for posted preprints (for example, regarding reuse of copyrighted material).

Preprint platforms are encouraged to enable authors to revise their work, since the opportunity to obtain feedback is a key goal. Where preprint platforms allow revisions to posted preprints, there should be clear version histories for reader reference, what changes were made and when should be clearly designated with each version of the preprint.

Each preprint platform should outline its intended scope, including whether or not it will accept drafts of papers independent of manuscript submission and peer-review status, potentially including articles already accepted for journal publication or even published in a journal.

Preprint platforms should also provide a clear description of the license type under which the preprint will be posted. They should also advise authors who wish to submit their preprint to a journal to check that it will be compatible with their target journal(s), and vice versa.

Finally, a framework that ensures the continuity of posted preprints is encouraged, but if the preprint could be removed either consistently or in response to a concern, those circumstances should be accompanied by a public notification. Clear policies in this area are necessary to set clear expectations, as well as to ensure consistent handling of any potential removals.

For Authors

Authors should carefully consider the policies of a preprint server prior to submission of content. Equally, authors looking to submit their work for publication at a journal should also consider relevant journal policies, such as if the prior posting of content as a preprint would interfere with consideration of a submission to the journal.

Authors should carefully read any copyright agreements for preprint servers to understand which rights authors give to the preprint platform, and what, if any, limitations are imposed for future use of the work. In this context, authors also need to consider any copyright policies at their institutions and ensure that preprint posting aligns with any existing institutional requirement.

Given that the preprint record can be considered as evidence of the authors' research output, authors should also ensure that any work they post on a preprint platform follows expected standards of research integrity and authorship attribution.

LIMITATIONS

COPE aims to provide advice and practical resources for editors and publishers on all aspects of publication ethics. This document has, therefore, been developed bearing in mind common editorial practices at journals and circumstances preprints may lead them to encounter. While **COPE** membership is currently comprised mostly of journals and publishers, **COPE** considers different membership categories and is willing to collaborate with different stakeholders and organisations who share its mission to promote publication ethics. Given the increasing role of preprint platforms as vehicles for the dissemination of scholarly work, **COPE** is considering offering membership to preprint platform providers. The membership criteria and practice expectations have yet to be defined, but this document aims to provide an initial framework. For any publishers that are already members of **COPE** and operating a preprint server, the preprint service is currently considered independent of the publisher's **COPE** membership.

APPENDIX

Examples of preprint platforms in different disciplines

Preprint Server	Site	Disciplines
AgriRxiv	https://agrixiv.org/	Agriculture and Allied sciences
arXiv	https://arxiv.org/	Physics, Mathematics, Computer Science, Quantitative Biology, Quantitative Finance, Statistics, Electrical Engineering and Systems Science and Economics
bioRxiv	https://www.biorxiv.org/	Life Sciences
ChemRxiv	https://chemrxiv.org/	Chemistry
EarthaRxiv	https://eartharxiv.org/	Earth Sciences
Earth and Space Science Open Archive (ESSOAr)	https://www.essoar.org/	Earth and Space Sciences
EngRxiv	https://engrxiv.org/	Engineering
MedRxiv	http://yoda.yale.edu/medrxiv	Medicine and Health Sciences (launch expected in 2018)
Open Science Framework hosts a number of preprints, including AgriRxiv, EarthaRxiv, EngRxiv, psyRxiv or SocArXiv	https://osf.io/preprints	
PeerJ Preprints	https://peerj.com/preprints/	Biological Sciences, Environmental Sciences, Medical Sciences, Health Sciences and Computer Sciences

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APPENDIX (CONT)

Examples of preprint platforms in different disciplines

Preprint server	Site	Disciplines
preprints.org	https://www.preprints.org/	Arts & Humanities, Behavioural Sciences, Chemistry, Earth Sciences, Engineering, Life Sciences, Materials Sciences, Mathematics & Computer Science, Medicine & Pharmacology, Physical Sciences, Social Sciences
psyRxiv	https://psyarxiv.com/	Psychological Sciences
Social Science Research Network (SSRN)	https://www.ssrn.com/en/	Social Sciences, including Economics, Law and Humanities
SocArXiv	socarxiv.org/	Social and Behavioral Sciences, Arts and Humanities, Law, and Education.

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11. COPE Core Practices: http://bit.ly/2puBdb4

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*Iratxe Puebla is an employee of the **Public Library of Science (PLOS)** which has entered a partnership with **bioRxiv.** Heather Tierney is employed by the **American Chemical Society (ACS),** which is a co-founder of **ChemRxiv.***

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