

A free speech focus

Open access is not a threat but an opportunity to improve scientific quality assurance, explains the European Geosciences Union's Ulrich Pöschl...

Open access to scientific knowledge is desirable for many good reasons. The free online availability of scientific research publications, which are mostly supported by public funding, offers a wide range of educational, economic and scientific benefits. With regard to education, open access provides state-of-the-art information and stimulation for students and teachers at schools and universities as well as for the general public; it removes social and regional barriers and supports equal opportunities in the global information society. Economically, open access liberates the distorted scientific information market (oligopoly structures and library budget crisis), and facilitates competition, innovation and efficiency in the distribution, evaluation and archiving of scientific information. For science, open access is urgently needed to foster interdisciplinary communication to meet the challenges of rapid environmental, technological and societal development.

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The traditional forms of scientific publishing and peer review do not live up to the needs of efficient communication and quality assurance in today's highly diverse and rapidly developing world of science. Besides high profile cases of scientific fraud, science and society are facing a flood of carelessly prepared scientific papers that are locked away behind subscription barriers, that dilute rather than enhance scientific knowledge, that lead to a waste of resources and impede scientific and societal progress. Thus, scientific publishing needs to be advanced by interactive and transparent forms of review and discussion that are open to the scientific community and to the public. Contrary to widespread misperceptions, open access is not a threat but an urgently needed opportunity for the improvement of scientific quality assurance:

- Open access is fully compatible with traditional peer review and, beyond that, it enables interactive and

transparent forms of review and discussion open to all interested members of the scientific community and the public (interactive open access peer review alias public, collaborative or community peer review);

- Open access gives reviewers more information to work with, ie. it provides unlimited access to relevant publications across different scientific disciplines and communities (interdisciplinary scientific discussion and quality assurance);
- Open access facilitates the development and implementation of new metrics for the impact and quality of scientific publications (combination of citation, download/usage, commenting and ranking by various groups of readers and users, respectively). Moreover, open access helps to overcome the obsolete monopoly/oligopoly structures of citation counting that have been stifling innovation in scientific research, publishing and evaluation over decades.

The effects and advantages of open access, public review and interactive discussion can be efficiently and flexibly combined with the strengths of traditional scientific publishing and peer review, as demonstrated by a growing number of innovative open access publications.

For example, the interactive open access journals of the European Geosciences Union pursue a two-stage process of publication and peer review combined with interactive public discussion.

In the first stage, manuscripts that pass a rapid pre-screening (access review) are immediately published as ‘discussion papers’ in the journal's discussion forum. They are then subject to interactive public discussion for a period of eight weeks, during which the comments of designated referees, additional comments by other interested members of the scientific community, and the authors' replies are also published alongside the discussion paper. While referees can choose to sign their comments or remain anonymous, comments by other scientists (registered readers) are automatically signed.

In the second stage, manuscript revision and peer review are completed in the same way as in traditional journals (with further rounds of review and revision where required) and, if accepted, final papers are published in the main journal. To provide a lasting record of review and to secure the authors' publication precedence, every

discussion paper and interactive comment remains permanently archived and individually citable.

The two-stage process effectively resolves the dilemma between rapid scientific exchange and thorough quality assurance, and it offers a win-win situation for all involved parties.

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The interactive open access publishing philosophy emphasises the value of free speech and efficient public exchange and scrutiny of scientific results in line with the principles of critical rationalism and open societies. Accordingly, editors and referees are supposed to critically comment and evaluate manuscripts, to help authors improve their manuscripts, and to eliminate clearly deficient manuscripts. However, authors will not be forced to adopt the editors’ or referees’ views and preferences. Instead, the readers will be able to make up their own mind in view of the public review and discussion. In case of any doubt, editorial decisions will favour free speech of scientists, and in the end, scientific progress; history will tell if – or to which degree – they were right. In scientific research, the line between fundamental flaws and major innovations can be fine, and the two-stage process of interactive open access publishing and peer review enables efficient balancing and differentiation between potentially misleading hypotheses and innovative theories, even in highly controversial cases.

The interactive open access publishing approach has already been successfully transferred into other disciplines. For example, the e-journal *economics* is published and supported by some of the most prominent institutions and scientists of its field. Similar and alternative concepts of public peer review and interactive discussion are pursued by several other open access publishers and publications in the life sciences. Note, however, that approaches where interactive commenting and public discussion are not fully integrated with formal peer review by designated referees, or where comments are not properly archived and permanently citable, tend to be less successful.

High and rapidly increasing rates of submission, publication and citation show that the scientific community values the open access, high quality and interactive discussions. They confirm that there is a demand for improved scientific publishing and quality assurance, and that the interactive open access journal concept meets this demand. Moreover, public review, discussion and documentation of the scientific discourse can serve as an example for

rational and transparent procedures of settling complex questions, problems, and disputes. It is a model for further development of the structures, mechanisms, and processes of communication and decision-making in society and politics in line with the principles of critical rationalism and open societies.

In order to foster communication, quality assurance and progress in science, the following recommendations go to scientists, publishers, librarians, institutions, and funding agencies:

- Promote open access to publicly funded research publications by appropriate guidelines and by moving funds from subscription budgets to publication budgets – preferably at high rates (20% per year or more). Obviously, traditional publishers are reluctant to undermine their profits as long as they can rely on rigid subscription schemes, but the ones who are ready to serve science will swiftly adapt to new financing schemes. The others can be substituted by new service providers as indicated by the swiftly growing number, size and visibility of open access publishers and journals.
- Promote interactive open access peer review in new and existing journals, repositories and other publication platforms. Public review and interactive discussion are technically straightforward and can be flexibly adjusted to different scientific communities, but care should be taken when dealing with key features of peer review and scientific discourse.
- Promote the development and implementation of new and improved metrics for the impact and quality of scientific publications (combination of citation, download/usage, commenting and ranking by various groups of readers and users, respectively). Open access is urgently needed to stimulate innovation by competition in this field, which has long been hampered by monopoly structures. The working capacities of librarians and related information professionals that may be liberated by the end of the subscription business are urgently needed for the structuring, processing, quality assurance and digital preservation of scientific contents, bibliometric data and statistical analyses both at scientific institutions and at commercial service providers.



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