



Leopoldina
Nationale Akademie
der Wissenschaften

THE
ROYAL
SOCIETY

Statement on scientific publications by three national Academies (*Académie des sciences, Leopoldina and Royal Society*)

Introduction

Researchers are increasingly overwhelmed by the growth of the number of publications that they have less time to read. Too many journals have been created over the last three decades. The recent evolution of scientific publications has been greatly influenced by the internet and the ease of creating new journals online, many of which appear to be of low quality. What should be done?

Since the first journals in the 1660s, *Philosophical Transactions*, *Le journal des Savants* and *Miscellanea Curiosa Medico-Physica Academiae Naturae Curiosorum*, more than 50 million articles have been published. "Web of Science" lists more than 40 million articles and it is claimed that one article is indexed per minute.

It is clear that science publishing is undergoing considerable changes in recent years. Some of these changes are beneficial to science, such as the move towards open access and open data. But others are the consequence of more negative effects such as the incessant pressures on researchers to publish more and more articles and to choose journals with very high impact factors. These pressures have given rise to a greatly increased volume of published articles and publication biases towards articles on fashionable or eye-catching subjects and away from high-quality articles reporting detailed studies, negative findings or replications. In extreme cases, these pressures even drive some scientists to commit fraud by manipulating their data or plagiarizing the work of others in the hope of securing publication in a few highly visible prestigious journals. The well-established scientific journals are inundated by manuscripts attracted by high impact factors (IF). The first pass selection for these journals is frequently not made by the classical peer review system, but rather by fast screening methods that are often influenced by how fashionable the manuscript is. Some researchers feel it is more important to publish an article in one of these high IF journals than to publish an article that will have a real importance for the long-term development of science.

Due to the ease of creating web sites and the trend for open access journals, many "pseudo-journals" have been created during the recent 5-6 years. Researchers are receiving invitations every week to become a member of the Editorial Board of one of these new journals or to submit an article and pay a small (or not so small) amount of money to make it "open-access". The proliferation of these "pseudo-journals" is creating a real damage to the scientific community by inducing a demand for more and more low quality articles (and even worse, for falsified and plagiarised manuscripts). These journals lack the essential mechanism of self-correction and critical review that science requires. The number of these pseudo-journals is doubling each year. The public will be, or is already, confused by this flood of "scientific articles" and will not understand what is a valuable scientific publication.

For all these reasons, the national academies of science in France, Germany and the United Kingdom have collaborated to produce a set of principles with the aim of defining best practice for scientific journals and calling for the highest quality of peer review, while at the same time avoiding the negative consequences of very high rejection rates operated by the highly visible journals and the proliferation of "pseudo-journals".

PRINCIPLES OF GOOD SCIENCE PUBLISHING

The *Academie des sciences*, the *Leopoldina* and the *Royal Society* propose a number of principles that are already in use by many journals, but which are neglected by some highly prestigious ones and deliberately ignored by many newer online journals of low reputation and readership.

These principles define a number of minimum conditions which should be satisfied in order to earn the label of "scientific journal". They might also be used as general guidelines for good practice to help researchers, particularly early career scientists, choose the best publication venues.

The guidelines have been written with four fundamental principles in mind:

- 1- Efficient and high-quality dissemination of scientific information.
- 2- The avoidance of all forms of conflict of interest.
- 3- The necessity to ensure fair reviewing of articles.
- 4- Keeping the handling and decision-making processes regarding scientific articles entirely under the control of well-recognised scientists.

1 - The reviewing and decision-making processes

The organization of the reviewing of an article and the decision to accept it, reject it or request modifications must stay completely under the control of well-recognized scientists.

The Editor-in-Chief (or equivalent) must be a highly recognized scientist, aided by an editorial committee composed of scientists of irreproachable reputation. Assistant editors should be chosen from scientists of good reputation to help in the reviewing process, specifically regarding the choice of reviewers and the treatment of their reports.

The duration of the reviewing process must be kept reasonable.

The rejection rate should be such as to avoid the choice from becoming too exclusive and a matter of chance. We encourage journals to operate "objective peer review" which emphasizes scientific quality, methodological rigour and statistical soundness over potential impact, novelty and fashionability.

Correspondence with authors must be succinct and complete, integrating the decision of the Editor-in-Chief or responsible co-Editor with the reports from the reviewers. It should not be limited to just communicating the comments of individual reviewers.

2 - Rules for reviewers

The reviewers must be required to:

- Respond to the request to review within a short length of time - for example within a week.
- Limit the length of their reports and make sure to include recommendations which are clear, reasonable, concise and fair.
- Write their reviews in the form of a recommendation intended for the Editor-in-Chief who has the final decision whether to accept or reject.
- Declare spontaneously if they have a conflict of interest as competitor or any other reasons and avoid reviewing in such situations.

3 - Status of the reviewers

The principle of anonymity of the reviewers must be respected unless they have chosen to waive it. However, the journal may reserve the right to communicate to each of the reviewers the names of the other reviewers. Reviewers should be free to waive their anonymity.

Publication of the review reports should be considered in order to encourage more balanced and professional peer review and to discourage personal attacks on authors. This decision should be made by the author(s). Reviewers could also be asked to publish a summary comment setting the work being published within its larger scientific context, thus contributing added value to the work of the reviewers.

Journals should make efforts to recognize the valuable work of reviewers, for example by publishing a list of peer reviewers in the journal.

4 - Open archives

Pre-publication reviewing is important to control the quality of articles. However, open archives and preprint repositories also have a valuable role in allowing the rapid dissemination of scientific work and encouraging large scale, post-publication peer review by the entire community.

To minimize delays in the dissemination of scientific work, articles should be deposited in open access repositories (also known as preprint servers). There are a number of established systems, including *arXiv* (for the physical sciences and mathematics) and *bioRxiv* (for the biological sciences). Such a deposit should not be considered a hindrance to the acceptance of an article by a journal and journals should make their policies clear on this matter. Significant effort should be made to improve the visibility of articles that have been deposited in open archives and which until now have not been taken into account by the main alerting services (for example *Web of Science, Pubmed and Scopus*).

5 - Open Access

We support the principles of open access and would like to see all published scientific work freely available under fully open licenses as soon as possible at sustainable publication costs for the scientific community. We support both "green" and "gold" routes to open access and believe that the funds currently spent on journal subscriptions should be re-directed to fund publication charges. Ultimately, we believe that the "gold" open access publication route is likely to be the most sustainable option for open access journals, but that the payment of an article processing charge must be clearly separated from the editorial decision. We would like to see science publishing move away from large corporate interests and a stronger involvement of academies and learned societies in order that any surplus funds may be used for the benefit of science. At the same time, authors should always retain their intellectual property rights.

Einstein's citation on publications: "An academic career, in which a person is forced to produce scientific writings in great amounts, creates a danger of intellectual superficiality" (in *Einstein, His life and Universe*, W. Isaacson, Simon and Schuster Ed., 1st Ed, p. 79 (2008); recently cited by D. Geman and S. Geman, *PNAS*, 113, 9384-9387 (2016)).

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