Peer review

Analyses using publication metrics typically examine peer-reviewed publications. Peer review of scientific publications refers to a procedure by which a journal, conference or book publishers publishing research results requests experts in the field of science to carry out a preliminary evaluation of the scientific quality of manuscript intended for publication. Peer review is also used in other research evaluation processes. In the evaluation of publications, the referees are independent post-doctoral researchers or other scientific experts who are not involved in the editorial process and are independent of the evaluated manuscript. Peer review is part of the research publication process (Figure 1).

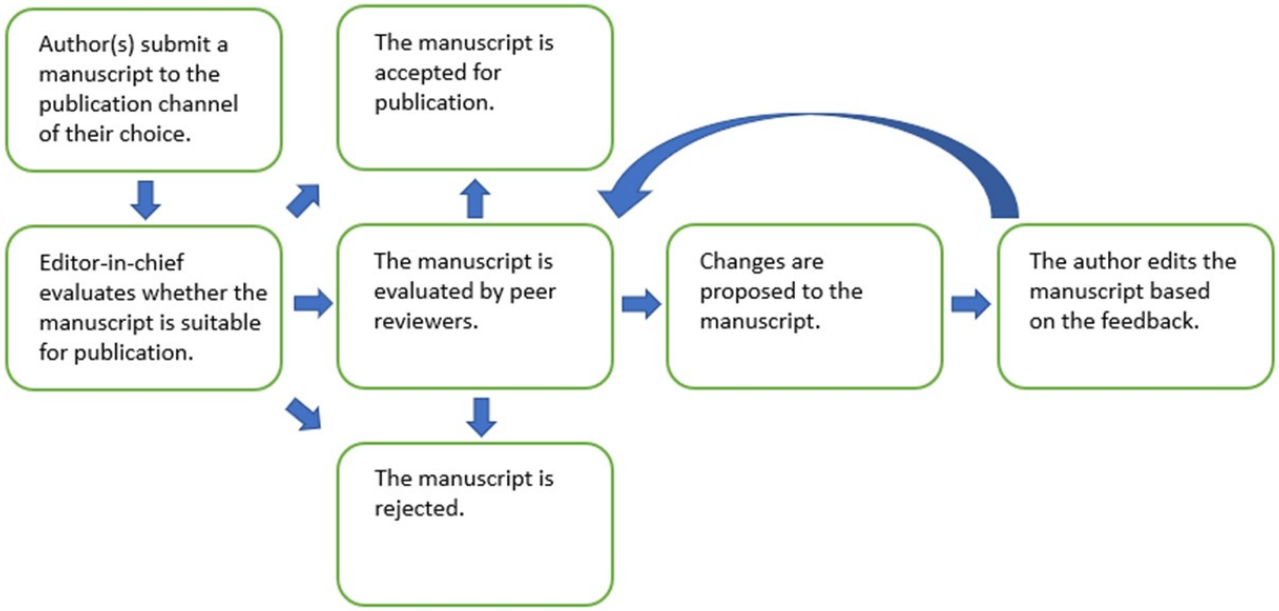

Figure 1. Peer review as a part of the research publication process.

The peer review process evaluates the data coverage, the understanding about the theoretical framework, the reliability and accuracy of the research and the originality and novelty of the results in relation to previous research in a way that is specific to the field of science. The process also evaluates the suitability of the manuscript for the publication channel and aims to improve the quality of the manuscript. Each referee proposes either to reject the manuscript or to accept it as it is or with minor/major revisions. Referees provide the publisher with a written referee report on the evaluated text. Sometimes a publication goes through several rounds of peer review before a final release or rejection decision is made.

Different methods of peer review

Peer review practices vary to some extent between fields of science, but the fundamental factor in carrying out a peer review is always the independency of the referees. Different methods of peer review have been developed to ensure independency.

In a *double-blind review*, the identity of both the author and the referee are kept anonymous. This method is preferred in particular in the fields of humanities and social sciences. Evaluation can also be carried out as a *single-blind review*, where only the identity of the referee remains anonymous. This method is more typical in the fields of natural sciences, technology, engineering and medical science. Peer review can also be carried out openly. In this case, the openness may concern the identities and/or evaluation reports of the authors and referees. An *open peer review* can be carried out in the traditional way as a preprint or a postprint. There are also different ways of carrying out an open peer review in terms of whether to invite specific peer reviewers into the process or to open the review to the wider community. The problem with open peer review is that not all researchers are willing to act as referees if the review is not anonymous.

Peer review by independent experts should not be confused with editorial review, which evaluates the suitability of a text in relation to the rest of the content of a conference or anthology, for example. Similarly, an evaluation provided by another author of the same book cannot be regarded as an independent evaluation, unless it is a double-blind review anonymous in both directions. Some journals offer open peer commentary on the internet for anyone who wants to comment on articles after they have been published in the journal, with the participation of the authors of the articles. However, this is not considered a traditional peer review.

Identifying peer-reviewed publications

Peer review is required for publications belonging to categories A1, A2, A3, A4, C1 and C2 of the Ministry of Education and Culture's publication type classification (see Chapter 'Publication', Table 2). The peer review practices of a publication are specified on the publication channel. You can also check whether a journal has been peer reviewed on the Ulrichsweb service. Databases Web of Science and Scopus only index articles from peer reviewed journals. However, both peer-reviewed and non-refereed publications (e.g. editorials) can be published on the same publication channel. In certain fields of science, it is also customary, for example, to publish an article in an open access repository (e.g. ArXiv, Zenodo) before it is peer reviewed.

Finnish academic publishers can apply for a *Peer-review label* from the Federation of Finnish Learned Societies, which indicates that the publication has been peer reviewed according to the qualitative and ethical standards of the international scientific community. To be eligible for the label, scientific publications must pass a prior peer review conducted by at least two independent referees. In addition to this, publishers must commit to complying with the other requirements of use. Applying for the label is free of charge and there are no membership conditions.

Problems concerning peer review

Although peer review is usually deemed a useful practice, it is not without problems and has been criticised. The main problems related to peer review are the slowdown of the publication process and the impact of biases on the review. For example, the referees may discriminate against authors based on their age, gender, career stage or affiliation, or prefer interpretations that support their own opinions. In addition to this, serious errors and defects in the article may not be detected during the peer review but may only become apparent after the article has been published. Especially in the small fields of science and countries such as Finland, authors can easily identify each other's work, even if the review is carried out anonymously. Recruiting suitable referees can also be challenging. Peer review may also facilitate plagiarism, in which case the referee misuses the unpublished data of the manuscript. However, problems in peer review are relatively rare and the more important issue is its impact on the quality of publications. There has not been much research on the impact of peer review and studies have mainly been carried out on biomedical journals.

Sources

Jubb, M. (2016) Peer review: The current landscape and future trends. *Learned Publishing*, 29(1), pp. 13-21. Available: https://doi.org/10.1002/leap.1008

Jytilä, R. ja Laakso, M. (2019) Selvitys avoimesta vertaisarvioinnista kotimaisen tiedejulkaisemisen kentällä. *Tieteellisten seurain valtuuskunnan verkkojulkaisuja 5.* Available: https://doi.org/10.23847/978-952-599516-9

Ross-Hellauer T. (2017) What is open peer review? A systematic review [version 2; peer review: 4 approved]. *F1000Research 2017, 6,* p. 588. Available: https://doi.org/10.12688/f1000research.11369.2

Vertaisarviointunnus (no date) Available: https://www.tsv.fi/fi/palvelut/tunnus

Weller, A. C. (2001) *Editorial peer review: Its strengths and weaknesses*. Information Today, Inc.