

Peer Review on the Move from Closed to Open

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Abstract. Openness in peer review is no longer a terra incognita. However, there remains a need for further experimentation and careful evaluation of its advantages and disadvantages in practice. OpenAIRE, the European digital infrastructure for Open Scholarship, offers a unique environment for such experiments. This paper describes the design and early results of three such experiments, which are currently under development in close collaboration with selected publishing and repository communities.

Keywords. Open peer review, eInfrastructures, open evaluation, peer commentary

1. Introduction

Open peer review (henceforth OPR) is no longer a terra incognita, with the first implementations and trials to explicitly categorize themselves as such emerging in the late 20th Century (van Rooyen *et al*, 1999). Indeed, some variation of OPR is now the established mode of peer review for many journals and publishers (Amsen, 2014). OPR is best defined in contradistinction to traditional or classical peer review. Traditional peer review is generally (1) *anonymous*, with either the reviewer unknown to the author (single-blind review) or both author and reviewer unknown to each other (double-blind review); (2) *selective*, with reviewers selected by editors; and (3) *opaque*, with neither the review process nor the reviews themselves made public. OPR, although often narrowly defined as peer review where author/reviewer identities are disclosed to one another (see e.g., Ford, 2015), is best understood as an umbrella term for a variety of innovative review methods that remove one or more of these conditions and thus add *transparency* to the peer review process. Hence, in our definition, ‘openness’ can refer to the absence of anonymity (*open identity*), self-selecting reviewers (*open participation*), public processes and reviews (*open access*), or some mixture of the three.

These elements are often complementary, and can be combined in various ways to produce a broad continuum of ‘openness’ in OPR. For example, some journals publish the entire multi-staged review process: the manuscript under review, the review reports and the authors’ responses, and the revised manuscript(s), while inferring links between the earlier released version(s) and the final version of record (Pöschl, 2004; Pöschl, 2012; Sandewall, 2012; Ford, 2013; Walker and da Silva, 2015). Sometimes reviewers

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themselves may decide how much information they would like to disclose during the review process (for a discussion of a wide range of examples see e.g. Walker and da Silva (2015)). Additionally, some journals open up the process to readers, allowing them to join the discussion of the paper through open peer commentary. *Table 1* gives an indicative (not necessarily exhaustive) overview of this continuum as it applies to various aspects of peer review variations of openness as currently implemented. (Note the table only takes into account the roles of author, reviewer, readers/commenters – journal editors typically moderate the review process and will continue to play an important role, e.g. in providing practical and ethical advice on open review processes).

Table 1. Options for openness in peer review processes.

Category	Fully open	Gradually open	Closed
Submitted manuscript	Published online as discussion paper	Available to reviewers with author names disclosed	Available to reviewers, author names blinded
Reviewer names	Publicly available on time of publication of reviews	Reviewer names are disclosed if they opt in	Reviewer names not disclosed
Access to review reports	Available to the public	Available to the author(s), reviewers may opt in to disclose reports to the public (blinded or non-blinded)	Only available to the author(s)
Release of review reports	Immediately available to the public (incl. the author(s))	Published after the review process is closed	Not published
Accepted vs. rejected papers	All review reports made available	Only for accepted papers	Not published

2. On Benefits, Biases and Limitations

Several research studies and reports from publishers setting up OPR processes have explored its benefits, possible biases and limitations. When authors and reviewers are asked about their preferences regarding peer review they continue to prefer the classical double-blind model (Taylor & Francis). However, such assessments may not be representative and some questions may be biased (Davis, 2015). Among the benefits reported by journal publishers who implemented OPR include more civil language, more thorough dialogue between authors and reviewers, better understanding of why the research was conducted and the decisions taken, and the use of review reports as educational tools and as case studies to provide guidance for reviewers (PeerJ, 2014). In addition, authors in transparent (open access) review “have a much higher incentive to maximize the quality of their manuscript prior to submission” and it also “prevents authors from abusing the peer-review process by delegating some of their own tasks and responsibilities to the referees during review and revision behind the scenes”, where reviewers often make substantial contributions to the quality of the paper (Pöschl, 2004).

One issue often raised about OPR is accountability: Disclosing reviews and identities forces reviewers to stand openly by what they believe. According to Kowalczyk, this also makes reviews more constructive (Kowalczyk, 2015). Further, OPR is said to prevent abuse and reduce biases (e.g. reputation of author/institution,

degree of conservatism / conformity, language, sex, age, against ‘negative results’, etc.) by its transparency and the wider engagement with the scientific community (e.g. Godlee, 2002; Smith, 2006; Perakakis, 2011).

Sometimes a higher quality² of review reports is expected (Prug, 2010; Boldt, 2011) but this does not seem generally result from openness (Vinther *et al.* 2012; Van Rooyen *et al.*, 2010, Kowalczyk, 2015). Epistemologically, OPR and its traceability can strengthen the professional discourse and the scientific community as a whole and in particular the exchange between authors and reviewers (Ford, 2013) (see also the concept of ‘extelligence’ (Friedman *et al.*, 2010)). Pragmatically, open review can prevent unnecessary duplication of effort in the sense that rejected papers’ reviews can be reused if the paper is resubmitted to other journals (Hames, 2014).³

OPR, and in particular publishing review reports, also aims at raising the recognition and reward of the work of peer reviewers. Adding review activities to the reviewer’s professional record is common practice; author identification systems currently also add mechanisms to host such information (e.g. via ORCID) (Hansen, 2016).

However, some of the benefits of open peer review may also be closely linked to possible pitfalls. Nobarany and Booth’s findings indicate that politeness in reviewer - author communication can affect the clarity and effectiveness of criticism, and can turn out to make the process more time-consuming. They suggest that a careful approach should be taken based on respective community norms, in terms of politeness level but also through structured reports (which ask for pros and cons for the primary aspects of the submission) and a technical system that allows interactive discussion (Nobarany and Booth, 2015).

While OPR can reduce several biases, openness may present an obstacle for some reviewers – especially junior researchers – who might be reticent to publicly criticize more senior researchers in the field. This effect might be avoided by not disclosing reviewers’ names if a paper is rejected (Pöschl, 2004). In the context of reviewing a special track of a computer science conference, Nobarany and Booth found “that less experienced researchers tended to express unmitigated criticism more often than did experienced researchers”; the authors could find no evidence that less experienced researchers avoided reviewing more experienced ones (Nobarany and Booth, 2015). Moreover, “reviewers tended to use more positive politeness strategies (e.g., compliments) towards less experienced authors” (Nobarany and Booth, 2015).

Furthermore, Blanes i Vidal and Leaver found that in settings where reviewers and reviewee share the same rank (in the studied case: the English Superior Courts), reviewers were reluctant to reverse the judgements of reviewees, in particular when a reviewer knows that he or she will soon work with the reviewee (Blanes i Vidal and Leaver, 2015). The authors conclude that to some degree this could be prevented through a change in the system of assignments. However, in very specialized disciplines where the community is small and interaction between reviewer and reviewee is likely, OPR might not be appropriate.

² The quality of peer review can be rated based on Van Rooyen *et al.*’s established Review Quality Instrument (RQI) (van Rooyen, 1999), applied and reproduced with permission in (Kowalczyk, 2015).

³ It must be noted that this is also an option and actually implemented in traditional or mixed settings, e.g. some publishers offer authors of rejected papers the choice to resubmit their manuscript together with the referees’ report to a different journal of the same publisher or within a disciplinary peer review consortium. Compare e.g. the Neuroscience Peer Review Consortium which brings together subscription-based and open access journals, <http://nprc.incf.org/nprc-overview>.

Open reviews can be considered as a new kind of publication. This allows reviewers' contributions to be fully acknowledged in the final published paper (Godlee, 2002) (for an example see Ford (2015) who reviews four open peer review implementations at STM journals and cites two review reports). However, this incentive might not yet be particularly strong: Van Rooyen *et al.* found that "the rate of refusal of reviewers to participate in the study was high at 55%". This reluctance might be due to anxieties related to public exposure and an expectation of an additional workload. Indeed, the study reported an "increase in the amount of time taken to write a review", which was not the case for papers which were accepted directly but statistically significantly higher for papers which were eventually accepted (reviews of rejected papers were not published) (van Rooyen *et al.*, 2010). Overall, authors seem to be less reluctant to participate in OPR than reviewers (80% vs. 40% for the journal PeerJ (2014), although this difference was found to be less pronounced by Taylor & Francis (2015)).

Table 2. Open peer review's benefits and limitations

Category	Benefits	Limitations
Language used in the review report	More civil language	Less direct criticism, may result in lack of clarity
Efficiency of the review towards reviewees	<ul style="list-style-type: none"> - Polite language can help to maintain authors' willingness to accept criticism. - Potential reuse of review reports in resubmissions to other journals. 	<ul style="list-style-type: none"> - More time-intensive for reviewers and authors - Follow-up reviews might perpetuate existing (negative) judgements.
Education about peer review	Good and bad practice can be highlighted, case studies serve as advice	Exposure as bad example can cause embarrassment
Quality of submitted manuscripts	<ul style="list-style-type: none"> - Authors submit more mature manuscripts - Less abuse of the review process by delegating tasks or responsibilities to referees - Reviewers contributions to quality are acknowledged and made transparent 	
Quality of review	<ul style="list-style-type: none"> - Potentially higher quality vis-à-vis a larger and public audience - quality can be directly assessed, e.g. based on the Review Quality Instrument (RQI) 	<ul style="list-style-type: none"> - More politely phrased but in substance generally the same quality - In some cases a higher quality could be shown
Early career researchers	Visible engagement with community members	Undesirable exposure of communication of criticism
Senior career researchers	Sharing of experience through providing access to high-quality reviews	Undesirable exposure,
Acknowledgement of reviewers	Full acknowledgement of reviewers' contribution by the research community and the public	Published reviews might not officially be rewarded in tenure and promotion processes
Language used in the review report	More civil language	Less direct criticism, may result in lack of clarity

3. Bridging eInfrastructures and Publishing Services

OpenAIRE (Open Access Infrastructure for Research in Europe) is a sociotechnical digital infrastructure for Open Scholarship in Europe and beyond. It brings together more than 50 institutions to foster and further the implementation of Open Science. In addition to operating an OA support, outreach and advocacy network of 33 National Open Access Desks (NOADs) across Europe, OpenAIRE serves the public interest by increasing the visibility of research outputs and linking digital entities to enable navigation. This technical infrastructure assists in organizing the ‘records of science’, in particular through exposing and curating links between digital objects: authors, institutions, research outputs such as publications and research data, projects and public funding streams who funded the research. Publishing environments, digital infrastructures and tools for open science continue to converge. However, gaps between these environments remain, limiting seamless navigation and selective sharing from one stage to another. Hence, one aspect of OpenAIRE’s broad research activities into how openness and transparency can improve scientific processes is its investigation of new models of peer review to literature and beyond.

OpenAIRE follows a holistic approach of representing and linking the process of knowledge generation and is committed to testing new forms of scholarly communication. Now in its third funding phase, OpenAIRE is hosting a range of experiments that aim at promoting and studying effects of open review in the context of digital infrastructures for open scholarship. The main aim is to demonstrate the ability to support the implementation of open peer review functionalities on top of eInfrastructures, which also bridges publication and/or review platforms with repository-based system. A related study will investigate the engagement and views of communities on open peer review, based on their practical experience within the experiment and possibly beyond.

3.1. Prototypes on Technology and Workflows

To support the implementation of open peer review functionalities on top of eInfrastructures OpenAIRE invited tenders for two prototypes (technologies and/or workflows) in the area of open peer review. The main aims of the tender process were (a) to encourage technological experimentation in the area of open peer review, (b) to investigate ways in which open peer review technologies might integrate with OpenAIRE’s infrastructure, including the repository Zenodo.org as well as other content aggregated, inferred, and interlinked by OpenAIRE, and (c) to provide case studies for evaluation in OpenAIRE’s wider investigation of open peer review. The two successful projects ‘The Winnower’ and ‘Open Scholar’ impressed by combining publication and/or review platforms with repository-based systems.

a) *The Winnower*

The Winnower is exploring whether post-publication peer review can be incentivized by publishing review reports and hence elevating them to the same level as original research, with all the affordances and services of scholarly publications. Towards this goal, The Winnower will directly integrate with the Zenodo repository by (1) acting as a platform for reviews of Zenodo content, and (2) depositing reviews published on The Winnower in Zenodo.

A core challenge of efforts to bring peer review from behind closed doors has been the lack of incentives for scholars to write and make public high quality reviews. And yet, peer review, more broadly construed, takes place every day amongst individuals, in groups, in labs, in classes around the world, and in the form of organized meetings informally referred to as ‘journal clubs’. These journal club discussions—disinterested reviews—tend to happen post-publication, as scholars of all stripes discuss works relevant to their research with their colleagues. This experiment therefore targets the incentivisation of the publication of such journal club proceedings and the innovative alignment of Zenodo and The Winnower. All reviews will be citable (through assignment of DOIs), preserved for the long-term (via CLOCKSS) and equipped with article-level metrics to measure their usage and impact. Moreover, limited financial incentives will be tested as an instrument to draw attention and reward early-adopter commitment.

b) Open Scholar

OpenScholar is a community-based effort which brings together information infrastructure providers, researchers and IT developers (DIGITAL.CSIC, e-IEO, IIIA, SECABA, ARVO). It capitalises on the existing infrastructure offered by open access repositories by enabling their conversion into functional evaluation platforms by developing a prototype open peer review module (OPRM) for open access repositories. The OPRM will initially be developed as a DSpace plugin but designed to facilitate subsequent adaptation to other repository software suites like Invenio (which underpins Zenodo) and EPrints. It will enable the peer review of any research work deposited in a repository, including data, code and monographs. The whole process will be open, with full text of reviews publicly available alongside the original research work, and transparent, with reviewers’ identities disclosed to authors and the public, and thereby engage the research community in an open and transparent dialogue over the soundness and usefulness of research material. It will also include a sophisticated reviewer reputation system based on the assessment of reviews themselves, both by the community of users and by other reviewers, in order to allow a sophisticated weighting of each review’s respective importance for the overall assessment of a research work.

3.2. From Blogs to Publications: Open Evaluation for OpenEdition

In addition to these technical trials, OpenEdition is carrying out open peer review experiments to model the workflow for the selection, review and revision of blog articles towards peer reviewed publications. The journal *Vertigo*⁴, whose blog is hosted via OpenEdition’s blog platform Hypotheses, was selected as the specific journal for experimentation. *Vertigo* is a popular journal that receives a large number of submissions – a pre-publication OPR protocol hence holds the promise of enabling the journal to process these submissions more efficiently. In addition to the high number of papers that must be reviewed, the journal also receives some contributions that for reasons of format and/or language are not ready for peer review although they are of scientific interest. The OPR experiment deals with these two types of submissions separately, via open peer review and open commentary.

⁴ <http://vertigo.revues.org>.

(a) The *open peer review* branch of the experiment operates much as traditional review except that names, review reports and annotations are made public. Review reports are displayed as comments to the pre-print, which the blog-form of the platform allows. Referees are also able to insert comments into the text itself using the open-source plug-in Hypothes.is. Once reports and annotations are published, a conversation can start between authors and referees. The first reports and annotations have already been published, examples are available online.⁵

(b) The second strand of the experiment does not aim to review pre-prints but rather to assist and guide authors to improve the quality of their papers such that they are ready for the peer review process. Hence, the *commentary system* is open to all, with the same technical possibilities as in the open peer review branch. Commentators can post general observations as comments to the pre-print at the bottom of the page⁶ and they can use Hypothes.is to submit annotations within the text⁷. Here again, commentators and authors can start a discussion over comments and annotations. The experiment started 1st of October 2015, on a basis of ten pre-prints.

A major difficulty within this branch of the experiment is to find commentators willing to engage. The mere technical possibility of commenting on pre-prints is often not enough to get users to comment – in such processes some mediation (by editors or others) is still required to engage possible commentators. Open peer review and open commentary protocols cannot exist as merely technical possibilities. Without human mediation, such protocols will be unsuccessful. Human mediation remains necessary in finding commentators and referees, explaining the process, advising authors and referees when new comments are posted, escorting users through the technical aspects and helping them maintain cordiality in critical debate.

4. Conclusions and Outlook

Given the heterogeneity of conventions in scholarly communication in different subject area it is not surprising that there cannot be a homogeneous solution for establishing OPR. The trials conducted by OpenAIRE aim to meet this heterogeneity by investigating various aspects and different solutions of OPR.

Despite the diversity of these trials and their orientation they also reveal overarching issues: besides the type of implementation this in particular concerns the acceptance within the community, notably questions of how to motivate reviewers resp. commentators. Hence, in addition to these trials, OpenAIRE will study the views of communities on open peer review, based on their practical experience within experiments and possibly beyond (e.g. open comments, transparency of processes, educational aspects, etc.). As OpenAIRE aims at exploring and facilitating improvements of scholarly communication, it will concentrate on how open peer review can be profitably applied and how the implementations might be improved in order to strengthen benefits and to mitigate unintended effects. All these experiments will be included in this study and further parties will be asked to review their experiences, share lessons learned and make suggestions on possible improvements.

⁵ <http://vertigo.hypotheses.org/1891>. To display the annotations and activate Hypothes.is the URL to use is: <https://via.hypothes.is/http://vertigo.hypotheses.org/1891>.

⁶ See <http://vertigo.hypotheses.org/2033#comments>.

⁷ See e.g.: <https://via.hypothes.is/http://vertigo.hypotheses.org/1970>.

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