

RESPONSE

Academic self-publishing: a not-so-distant future

Pandelis Perakakis^{a*} and Michael Taylor^b

^aDepartment of Personality, Evaluation and Psychological Treatment, Faculty of Psychology, University of Granada, Spain; ^bSpace Research and Technology Group, ISARS-NOA, Penteli, Greece

Pandelis Perakakis is a clinical psychophysiologicalist, an active advocate of green open access and a proponent of a new research evaluation model called 'author-guided peer review'. In 2012, he and others founded Open Scholar, a not-for-profit community organization concerned with the way scientists and the rest of the world access research. Its flagship project is LIBRE (LIBerating REsearch). Michael Taylor is a mathematician working on the impact of aerosols and the use of satellites for weather forecasting.

Introduction

In their Proposition, Harvie *et al.* (2014) do a magnificent job describing the infuriating facts of today's academic publishing landscape. We all know how the system works and how the game is played. Here, we want to present an alternative reality facilitated by the free open peer-review platform, LIBRE (2013), and suggest specific actions that will help the scientific community move towards a more open and efficient knowledge evaluation and exchange system that divorces peer review from journal publication (Perakakis, 2013).

A glimpse into the future

Erin is driving back home from the laboratory with a big smile on her face. After an exciting three-hour brainstorming session discussing the intracranial EEG data from her last experiment, she can't wait to get her hands back on the manuscript. A new and unexpected interpretation of the findings seems to challenge a popular assumption about the role of sleep in declarative memory consolidation. She had been looking over the figures for more than a month without seeing a clear pattern. But now, thanks to a moment of insight by one of her colleagues, the pieces finally fit

*Corresponding author. Email: peraka@ugr.es

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together and a new logic is emerging. She realizes it will be hard for the community to accept these new findings, but the methodology is solid and she is now convinced that this is the only reasonable explanation. She is so anxious to see what Axell's group thinks about new evidence that refutes its theoretical model.

After a week's hard work, the first draft is ready. All the figures and their long descriptive legends are in place, the literature review is exhaustive, the methodology is clear as a bell, and the conclusions situate the finding in the general context of the role of sleep in memory consolidation. Today, the group had a brief morning meeting to decide which colleagues they will ask to review their draft. Of course, they will ask Axell for his opinion and constructive criticism, but they also agree to invite Barber to confirm that the application of independent component analysis on the data was performed correctly, and Stogiannidis to comment on the modification of the memory consolidation scale. For a review of the general intracranial EEG methodology, the group decides to first approach Favril herself and, if she declines, they will ask Zhang, who recently reviewed the subject for *Nature*.

After the lunch break, Erin submits the manuscript to the university's preprint repository that provides a DOI (digital object identifier) and an open attribution licence. When she hits the submit button, she feels a chill running down her spine. More than a year's hard work is finally freely available to her peers and the public. The next important step is to invite the reviewers. She logs in to her LIBRE profile and inserts the metadata of the manuscript with a hyperlink to the repository version (see LIBRE, 2013). She then clicks the invite reviewer button and writes a quick personal message to Axell, briefly summarizing the main result of the study and why she thinks his opinion is vital for the debate this manuscript will spark. She then invites Stogiannidis to comment on the modification of the memory consolidation scale, and Barber, specifically asking him to check the application of independent component analysis, and also letting him know that all data are freely and openly available at Figshare. After finishing with the formal invitations, Erin tweets the LIBRE link to her followers and sends it as a personal message to specific colleagues from whom she would like to receive general comments. She can now relax. The word is out!

A couple of weeks later, Erin is back at work on the project. Both Favril and Zhang refused to review because of heavy work schedules, but Stogiannidis wrote an excellent report totally approving the modification of her scale. She even suggested a future collaboration to test the new version on a wider sample. Barber also submitted a brief review saying that he doesn't find any caveats in the analysis and approves the methodology. As Erin expected, Axell didn't take the new result lightly. He submitted a harsh critique, questioning both the methodology and the interpretation of the main findings. He even mentioned that there is a new paper by his group currently under journal review, reporting on a similar experiment with opposite results. Being pipped to the post and being second to report on this innovative experimental design, he must be really peeved, thinks Erin. She grins. Maybe he will learn the lesson and consider self-publishing next time. Anyway, Erin doesn't worry too much as there are already two independent colleagues who have marked Axell's review as biased on LIBRE. Last night, Xiu, Erin's colleague, finished retouching one of the figures based on a very insightful comment by one of LIBRE's readers, and today she will upload a new version of the manuscript, inviting some more reviewers.

Two months later, Erin's paper is now in version number 4.0 and everyone in the group believes it is ready for submission to a journal and further dissemination. The

issues raised by seven reviewers have now been adequately addressed, and Axell's review has received six biased marks and two negative comments. In addition, the paper has attracted a lot of attention in the social media and has been downloaded dozens of times from the institutional repository and has been viewed just over 300 times in LIBRE. The *International Journal for the Study of the Role of Sleep in Memory Consolidation* has already been in touch with Erin and invited her to submit the paper to them, but everybody in the group thinks the work is of interest to an even wider audience and that it should be submitted to the *International Journal for the Study of Memory Consolidation*. It charges a little more – 200 euros – but it is slightly more esteemed in the field and well worth the extra outlay. The group is even considering sending the manuscript in parallel to other journals that embrace a broader neuroscience community, now that the group's copyright and intellectual property rights have been protected. Anyway, what is important (and will count more in the grant proposal Erin plans to submit next year) is that the work has now been openly approved by seven experts in the field. She is also positive that this paper will attract ongoing reviews and that she may even be invited as an expert reviewer herself now that she is more visible in the field. A debate has started in her department about how much the reviewer's track record should weigh in how future tenure decisions are evaluated, and she has been invited to give a talk on her experience with LIBRE and the versioning of the group's manuscript, which has now become a dynamic paper (Perakakis *et al.*, 2011).

What is publishing anyway?

Although the workflow described above is quite different from what many of us are used to, it is not necessarily a distant reality. In fact, all the necessary tools needed to adopt a similar open and transparent approach to research communication and evaluation already exist. Physicists have been practising self-archiving in arXiv since 1991 – just two years after the invention of the World Wide Web and the same year that the first website at CERN was launched! This begs the question: what is the difference between self-archiving on preprint servers and publishing in academic journals? Why do physicists, having widely adopted a practice that makes all research available the minute it comes out of the lab, still pursue journal publication? Obviously, it is not to publish since their work has already been made public in a highly visible medium (www.arxiv.org is ranked on the global Alexa ranking list at position #10,713 with a PageRank of 8, has a total of 67,808 daily visitors and 2,034,240 monthly visitors watching over 4,475,340 page views!). Indeed, with the advent of institutional repositories, intra-disciplinary and multi-disciplinary preprint archives, online libraries and even personal webpages and blogs, journals are no longer the only publication medium for academic research. Moreover, most journals are not even an efficient publication medium; they restrict access behind paywalls and do not have a strong representation in social media, which is the modern way of disseminating research quickly and to large audiences. If a researcher's only concern were to get his/her message out, publishing in a traditional, closed access academic journal is definitely not the best way to go. The answer is that physicists, like the rest of the scientific community, are publishing in journals, not to make their work accessible, but to acquire a quality certificate.

The important thing to understand here is that we do not need journals to publish anymore. Instead, they are being used by scientists to perform quality control and to filter out bad science. For this service we:

- pay publishers extortionate subscription fees or OA article publishing charges if we choose (or are forced to choose) the gold open access model and open access options;
- accept that our work will be locked in the drawers of editors and reviewers for months or even years;
- grant publishers all rights to disseminate and make profit from our work;
- offer our review services for free and without any academic recognition;
- allow all the qualitative information provided by reviewers' thoughtful reports to be condensed into a digital yes or no decision, and hide them from the Public;
- subject ourselves to high rejection rates and spend valuable time re-formatting the same paper over and over again to comply with different publication guidelines;
- split our research into many different papers to accumulate more publications or to satisfy page count criteria;
- remove colour from figures to keep publication costs down;
- compress the methods section, thereby depriving the public of important details needed for reproducibility;
- adapt and self-censor our research and writing style to accommodate the tastes of journal editors;
- throw away important negative or seemingly less-significant experimental results;
- miss out on the chance to have a constructive dialogue and even collaborate with reviewers to advance the work; and
- feel obliged to investigate hot and sexy topics rather than exciting phenomena at the fringes of a field, where paradigm change is often found.

As we can see, the journal service is restraining scientific progress in various ways. The biggest blows are caused by rejection rates and lack of access. Journals are effectively interfering with the natural selection process in science (Perakakis *et al.*, 2010).

Towards change

Usually, when an outdated system continues to triumph despite the existence of superior alternatives, it is because someone still benefits from it and controls the *status quo*. In the case of academic publishing, we argue this 'someone' is the consortium of commercial publishing houses. It is crucial to understand that the current model is detrimental to everyone else: science, society, scholars, governments, universities and even private commercial companies exploiting research results. This is not a battle between good socialist scholars and bad capitalist publishers. It is not about discarding profit-making for the dissemination of scientific works. It is not about creating an idyllic society of happy scientists openly collaborating and sharing everything with no conflicts of interest. It is simply about uprooting an obsolete

system and replacing it with a more efficient alternative that will liberate research and boost scientific production for the benefit of all.

The road to change is going to be a bumpy one. Our opponents will not only be the commercial publishers; we will also encounter academic institutions, scholarly societies and research committees laden with inertia, and politicians, journalists and even entire governments lobbied by, or directly or indirectly supported by, the publishing industry. We suggest that the Finch Report, discussed in the Proposition by Harvie *et al.* (2014), is one example of how big publishers have managed to infiltrate the open access movement to try to ensure that the new revolution will leave their profits intact.

In our efforts to bring about a new culture in scholarly communication, we will also encounter the opposition of some scholars who have managed to reach their academic peak within the current system and therefore see no reason for changing things, journal editors who see themselves as the gatekeepers of scientific quality, academic groups lobbying with editors to promote and protect their work and, of course, colleagues who are simply too afraid to try something different for fear of risking their publication record and therefore their options for grants and promotion.

But we will not be travelling alone. We will find on our side all those scholars who are fed up with the pressure to publish X papers per year knowing few will actually be read or cited, scholars weary of restricted access, biased metrics, anonymous and unaccountable reviews, absurd journal rejection rates, strict and non-uniform publication guidelines, scholars denied the freedom to investigate less popular topics and ultimately doing science to publish rather than to question, discover, understand, expand, collaborate and communicate.

So what should be done?

We propose a bottom-up, quiet revolution that will help our community move from competition to collaboration, from financially crippling to free, from closed to open access, a quiet revolution that will bring about a gradual shift in the way research work and individual scholars are evaluated by university committees and funding agencies. Most of all, this revolution can be accomplished by scholars adopting new self-publishing practices that cost little of their time, and involve absolutely no risk. We suggest the following workflow.

- (1) *Upload your manuscript to a preprint repository as soon as you consider it is ready for peer commentary.* There is already a range of free, open access paper repositories that accept manuscripts not yet formally published by an academic journal. Ideally, this role of hosting non-reviewed, unpublished manuscripts can be assumed by institutional repositories. University librarians can then perform a quick check that manuscripts comply with certain standards, and the name of the institution can be a first quality certification for the presented work. There are also intra-disciplinary and multi-disciplinary repositories, such as arXiv, that can host manuscripts by non-affiliated authors. All preprint repositories should be able to guarantee permanency of content, provide a digital object identifier to make the work immediately citable, and allow authors to choose among a wide range of open licences.
- (2) *Use an independent peer-review platform and invite experts to evaluate and comment on your work.* Journal-independent peer review is a relatively new

concept, one that we consider the ingredient missing from the current academic publishing model, and one that is key in helping to liberate research and move towards true self-publishing. There are some noteworthy, free platforms already available for independent peer review. LIBRE, however, is the only initiative so far that combines: (a) a non-profit organization run by volunteers, which is important to avoid conflicts of interest between stakeholders; (b) an author-guided philosophy, where authors themselves control and administer the review process being able to invite any competent colleague; and (c) a versioning system to enable a dynamic collaboration between authors and reviewers, and to keep a public record of the whole evolution of a research work.

- (3) *Submit the final, peer-reviewed version to an academic journal.* This important step ensures that authors continue to benefit from the additional quality certification and prestige associated with journal publications, still perceived as necessary for grant applications and tenure. Submitting papers that have already been positively evaluated at open peer-review platforms like LIBRE is good for authors because it increases their chances of acceptance. For journal editors, it relieves some of the pressure involved in finding appropriate reviewers and reduces the risk of accepting low quality or even methodologically flawed papers. Of course, nothing prevents editors from continuing to request referee reports from anonymous reviewers in accordance with standard journal practices. To protect authors, LIBRE provides a list of journals that accept papers for consideration that have previously been openly reviewed. This list keeps growing as authors suggest new additions. LIBRE then contacts their editors directly to ensure collaboration.
- (4) *Update your open, online paper to reflect the last, peer-reviewed version.* A digital platform allowing versioning is essential to gather in one place all information regarding the evolution of a manuscript, from first draft to the journal-published version, including the full text of peer reviews and other less formal comments by the community. Authors should make sure to update the last version of a paper on institutional repositories or open access platforms like LIBRE, even after formal publication by a journal. For the moment, and until all journals comply with the green open access protocol (that allows further dissemination of the journal version immediately after publication), this step depends on the author's choice of journal. In this, a big help is the RoMEO (rights metadata for open archiving) service, which catalogs publishers by the rights authors have to place their work in freely accessible archives or repositories. At present, out of 1291 publishers, 804 (62%) allow authors to archive preprint and postprint or publisher's version/PDF (SHERPA/Romeo, 2013). Worldwide, out of 124 funding agencies, 75 (60%) now require authors to self-archive (SHERPA/Juliet, 2013).
- (5) *Do not be afraid of post-publication peer review and commentary!* Science is dynamic. Our job as scientists does not end as soon as a paper is published. Our ideas and results are constantly evolving and being put to the test. Open peer review and paper versioning take this process for granted so that science can do what it does best – ensure that ideas discovered by humanity really stand up to scrutiny.

Conclusion

Classical science was highly aware of the need to copyright discoveries. Galileo Galilei protected his intellectual property by using cryptography to scramble his findings and then sending a date-stamped hand-written copy to all his competitors. If someone made claim to something he had earlier discovered, he could reveal the original and decode the copies he had distributed. This was soon done away with when journals entered the scene, introduced peer review and became the gatekeepers of knowledge and quality. However, what we term their greed has turned scientists into serfs, and their short-sightedness has caged the potential for an explosion in knowledge creation brought about by the web revolution. Despite this, science has continued its forward march and has started producing its own solutions. Modern academia finds itself once more on the verge of a major paradigm shift.

We saw how Erin's publishing experience is an achievable reality and one where academics can easily copyright, disseminate, evaluate and version their own work. Sooner or later, when scholars are ready to embrace a new publishing culture, journals will have to adapt and respond to the needs and demands of modern science. There is still important room for them in the scholarly communication landscape and the research community is ready to support reasonable and ethical publishing business models that respect the free and open evolution of knowledge.

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