

Academic Culture: A Comparison of the Open Access and Subscription Journal Models in Publishing

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Abstract

Open access journals and subscription based journals represent two different philosophies surrounding how academic research should be disseminated. In this paper an exposition of the two different models is given in the introduction. A review of the literature examines the scientific impact of publishing in each journal type, with some surrounding discussion on advantages and disadvantages associated with each model.

Introduction

The traditional path for researchers to disseminate research has historically been through submitting articles to publishers of so called *subscription journals*. These journals are typically owned and run by publishers who take care of the costs of publishing and printing, in addition to handling the logistics of finding peer reviewers. As a means to recover the associated costs of publishing, a subscription journal charges its readers a subscription or licensing fee in exchange for access to the research it publishes. A non-subscriber wishing to read a specific article in such a journal may have to either purchase the entire published issue, pay a pay-per-view charge or purchase the article online – depending upon the particular publisher. An example of a journal published under the subscription based model is *Nature*, published by Springer Nature.

In the 21st century the emergence of an alternative publishing model called *open access publishing* has made inroads in the academic sphere. There is no single unified open access model, but rather a spectrum of different degrees of open access. The general philosophy underlying the movement is that research should be made freely available and openly accessible to readers. However, the details of how the philosophy should be translated into practice differs.

With the advent of the internet academic publishing has largely shifted from print to electronical formats. Anyone with access to the internet can, in theory, easily gain access to any piece of information. The view of the open access publishing movement, as a consequence, has been that all research ought to be made freely available and openly accessible online by the publisher.

The manner in which research is made freely available varies. In the field of mathematics and computer science it is common to “self-archive” papers. Authors themselves upload preprints (yet to be published or peer reviewed articles) or finished articles to popular repositories such as arXiv. Another route is to publish through so called open access journals. The costs of publishing are then generally shifted onto the authors, which pay article processing fees to reimburse the journal for some of the costs associated with editing, publishing and peer review. It should however be noted that not all open access journals charge fees, nor do all of them provide rigorous peer review.

Whereas print paper journals need to apply length restrictions due to space considerations, online journals can choose to be more flexible with article formats. Since many open access journals publish solely online, there subsequently is no restriction to the amount of articles they may publish. As a result publishing criteria for open access online journals such as PLOS ONE may focus more on the analyses performed being of a “a high technical standard” (PLOS ONE n.d.) over other inclusion criteria. In contrast, traditional subscription journals may, because of space considerations, require published results to be novel, and for the research in question to provide a significant contribution to the particular field.

Literature review

A study from Björk and Solomon (2012) reviewed the scientific impact of open access journals as compared to subscription journals. The study used the metric “impact factor” to assess a journal’s scientific impact. A journal’s impact factor is defined as the average number of citations of the articles it has published in the past two years. Björk and Solomon combined data collected from four different academic databases to obtain information on the year and the country in which a journal was founded, citation indices for its articles, along with other article and journal metadata.

On the aggregate data set Björk and Solomon (2012) found open access journal impact factors on average were lower: 76% and 67% compared to those of subscription journals depending on whether the citation database used was Journal Citation Reports or Scopus. However, when the authors analysed impact factor according to region and journal founding year, it was found younger open access journals (founded 2001-2012) perform roughly equal to subscription journals founded during the same time period. The data set was then further divided into the disciplines Medicine and Health and compared to all other disciplines. The authors comment how differences in impact factor among Medicine and Health journals disappear for newly founded journals (2001-2012), which they deem to be of a higher quality and standard.

Finally Björk and Solomon look at whether the impact factor of open access journals which charge authors an article processing fee differ as compared to other open access journals without fees, and as compared to subscription journals. Here open access journals with article processing fees which were founded after 1996 perform almost equally well as subscription journals. In contrast, open access publications without authors’ fees have only a third to a half of the impact factor of subscription journals.

The authors, in my view, offer up a plausible explanation as to why open access journals with article processing fees founded prior to 1996 have such low impact factors. They expect these journals to be those which have converted from a subscription model to an open access one. It is in my opinion conceivable the journals changed business models because they did not have a sufficient subscriber base.

In the analyses of results Björkman and Solomon were, in my view, highly thorough to control for region, discipline, the journal launch year and article processing fees. They may otherwise have had the results of their research called into question, as impact factors may differ depending on discipline or journal type. Impact factors have also been criticized as the majority of published research tend to get few citations (Callaway 2016), meaning a distribution of citations is going to be left skewed. Thus, a metric which is based off of the mean of such a distribution may not be the most representative measure to act as a proxy for determining scientific impact. One can therefore question whether the authors should perhaps have used a metric not based off of the mean. Although, in my view “impact factor” has become such an established and well known term that its omission may have caused the contents and analyses contained within the article to become less relatable for the intended audience (presumably academics).

In 2013 an article with the title “Who is afraid of peer review?” (Bohannon 2013) caused a great commotion among the scientific community. The author sent out 304 versions of an article with claims that some randomly chosen molecule (in a database of plausible molecules) from a randomly chosen algae caused a lower incidence of cancer growth in some particular randomly chosen cancer cell. The articles were sent to 304 open access publishers, drawn from two different sources. The first one a supposedly complete directory of open access journals: “Directory of Open Access Journals” (DOAJ). The second one an online list of “predatory” publishers.

From the 304 papers, only 255 received a response (Bohannon 2013). Out of the submissions which received a response, 45% were accepted in the DOAJ sample while 82% were accepted among the list of predatory publishers. Bohannon noted that the majority of publishers showed no sign of having reviewed the paper at all, with only 36 of the peer reviews pointing out any scientific problems whatsoever.

While Bohannon’s article was thought provoking, it could in my opinion have lent its author more credibility by also including subscription journals in the sample. Especially in order to convince and appease the open access community that he harbors no biases in terms of focusing the study only on one publishing model. An additional point of improvement may in my view have been to include more data on the type of journal,

with some inspiration from Björk and Solomon’s (2012) division into article fee and non article processing fee journals. Nonetheless, Bohannon did in my opinion manage to shine a light on the potential pitfalls of unregulated and unchecked open access publishing. There is an abundance of publishers, and it may be difficult to distinguish the legitimate actors from predatory ones.

Discussion

I think that both subscription based publishing and open access journals do have a place in the future. A journal being open access does not necessarily mean nor imply it follows the online publishing model of accepting as many papers as it can put through a scientifically sound peer review process. There exists a spectrum of open access journals, where some of them are print journals which also make available either the entirety or parts of their content for free online. The same applies to subscription journals, where certain journals allow authors to pay a fee to “open access” their articles online, despite the journal primarily being based on the print based subscription model.

In terms of the variety of content published in these journals, I think there is an argument to be made that the traditional print journals offer a service of curating content for its readers. No single human being can conceivably read the combined scientific output in their respective disciplines. If some journals have very strict criteria for publication, such as demanding published results have novel and significant contributions – then they are in a sense providing a service where they curate content so the reader does not have to.

However, one may object that in demanding significant contributions important research such as replication studies and null findings do not get published. Well, I think this is where online open access publishers can come in and highlight these sort of studies which are important and critical, but may not receive much space in traditional print journals. It is important for scientific research that all findings be published, whether it be a significant result, a null finding or a failed/successful replication study, lest scientists repeat research others have already conducted but never published! One such initiative to highlight negative, null and inconclusive results was for example made by PLOS (PLOS Collections 2015).

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