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12 Publishing

Chapter 11 examined the tenure and reward process and how closely allied it is to publishing. The printed word has played such a central role in the development of scholarship that at times academia can seem little more than an adjunct to the publishing business; we do after all refer to the academic *paper*. The central role of publishing has a long history in academia, with *The Philosophical Transactions of the Royal Society* being published in 1665. The nature of the academic article and the associated peer-review model developed until it became the accepted practice across most disciplines (it is a model not well suited to the arts, which focuses more on portfolios of work). This chapter will look at how the academic publishing business operates, some of the issues it now faces, the alternatives that are being developed as a result of technologies and where it might be heading. If any practice is central to the nature of scholarship it is that of the academic publication (be it book or article), and no focus better illustrates the tensions between existing practice and the possibilities offered by a digital, networked, open approach.

The academic publishing business

A research student of mine was thinking about submitting his first paper to an academic journal. He casually asked how much he would be paid for his contribution, acknowledging it probably wouldn't be much. I explained that not only would he not be paid but that for some journals the authors were themselves expected to pay for the article to be published. He was shocked by this revelation, 'but, they sell the journals don't they?' In return, my student's reaction caused me to take a backward step and reappraise the model we have come to accept in scholarship. And when you do so, the inevitable conclusion is that academic publishing is a strange business.

The conventional academic publishing model is comprised of the following steps:

- 1 Research – academics will engage in research, either funded by a research body or as part of their institutional contract.
- 2 Authoring – either in collaboration or as sole author, academics write articles.
- 3 Submission and review – the article is submitted to a journal, where the editor will often perform an initial quick review to ascertain whether it is

broadly suitable and then put out to review by recognised scholars in the field. Some journals have paid editors and reviewers, but the majority are volunteers who provide their labour for free.

- 4 Rejection/modification – following review the paper can be accepted, require revision or be rejected. If rejected the process may begin again with a different journal.
- 5 Publication – the article is published in a journal after a process of copyediting, adding data and formatting.
- 6 Dissemination – the journals are sold to libraries and other institutions often on a subscription model, or the article can be purchased via a one-off payment.

When authors agree to publication with a journal, they are usually required to sign a copyright form, assigning the rights of that specific paper, but not all of the intellectual property therein, to the publishers. There are thus three main parties in the process: the academic authors, the publishers and the libraries and purchasers. In most cases the academic authors are employed by universities and institutions, which also house the libraries that purchase the content, with the publishers acting as an intermediary. Other participants include research funders who provide the money for the initial research and the readers of the finished article. Given that the authors provide their services for free, and the same institutions that employ these then purchase the outcome of their labour, it does seem an unusual business model when viewed objectively.

So why do the first and last of our three main parties in the process, scholars and institutions, participate in the process? Here are probably five main elements to the answer:

- 1 Accepted practice – this is how respected peers in their field operate, and through the process of research studentship it is the practice they have been enculturated into.
- 2 Academic respectability – journals operate as a quality filter, using the peer-review method to ensure that (usually) journals are of an appropriate standard and have used a sound methodology. Being published in journals then is the accepted method by which research is perceived as credible and respectable.
- 3 Reward and tenure – as we saw in Chapter 11, the process of tenure is often linked to a strong publication profile.

- 4 Dissemination – publishers have well-established dissemination routes, so an article in a respectable journal will be made available via libraries, online databases, search engines and so on.
- 5 Curation – there is a durability and process for preserving articles for future access, through relationships with libraries and their own archiving practice.

This model has operated well for many years, and certainly when there was a reliance on printed journals there seemed little alternative. But as we see an increasing shift to online journals, inevitable questions about the sustainability and desirability of a print-based model have been raised. This is a fine example of Bellow's law in action yet again – once the journal has been liberated from the printed format, a number of related assumptions begin to unravel and lead to more fundamental questions. Before we look at these, however, it is worth examining the publishing business in more detail.

For each of our three players we can look at some recent market analysis. In terms of the authors, the Joint Information Systems Committee (JISC) review by Houghton *et al.* (2009) estimate that in the United Kingdom alone, in 2007, writing peer-reviewed articles costs around £1.6 billion (in terms of academic time), with an additional £200 million for peer review and a further £70 million for editorial costs. For the publishers, Bousfield and Fooladi (2009) size the science, technical and medical 'information marketplace' (which is largely publishing and related products) at \$23.1 billion in 2009. There are three big publishing firms, Reed-Elsevier, Springer and Wiley, who account for 42 per cent of all journal articles published. Of these, Elsevier, the academic publishing branch of Reed-Elsevier which focuses on science and medical publication, reported profits of \$693 million in 2009, with Reed-Elsevier reporting operating profits of \$1.5 billion (Reed-Elsevier 2009). There are about 22,000 peer-reviewed journals in publication, from some 9,900 publishers (Waltham 2009). McGuigan and Russell (2008) report that for the last of the key participants, the libraries, the economic situation has become increasingly tough, with costs for journals increasing 302 per cent from 1986 to 2005, while the number of items purchased has only increased 1.9 per cent per year, and on average journals have increased in price by 7.6 per cent per annum.

What this brief summary indicates is that academic publishing is a significant global business and that in times of financial crisis there is a squeeze on the middle of our participants, the publishers. This pressure is coming from the individual scholars (and more significantly, the research funding bodies) in terms of open access and from libraries with regards to the deals they are making with publishers. We will look at open access in more detail later, but for the libraries the situation is becoming critical. Many libraries have signed what are termed 'big deal' contracts, whereby publishers sell a subscription to their online catalogue, with annual increments. However, if a library wishes to cancel one or two journals then the cost of the

others increases. When libraries are facing cuts in their annual budgets, the Big Deal packages become expensive to maintain. A number of universities (e.g. Cornell) have withdrawn from the Big Deal, and many others are seeking to renegotiate. I would contend that it is not these contracts with publishers that are of interest to digital scholarship but rather that the financial pressures and the possibilities offered by new technologies create an environment wherein scholars, libraries, universities and research funders are asking fundamental questions about the scholarly communication process, and often the current model does not stand up to scrutiny.

David Wiley presents a parable, that of the inventor, who having struggled for years finally has an invention she wants to take to market:

[T]he inventor began contacting shipping companies. But she could not believe what she heard. The truckers would deliver her goods, but only subject to the most unbelievable conditions:

- The inventor had to sign all the intellectual-property rights to her product over to the truckers.
- The truckers would keep all the profits from sales of the inventor's product.
- The shipping deal had to be both exclusive and perpetual, never subject to review or cancellation.

Every shipping company she contacted gave the same response. Dejected, but unwilling to see the fruits of all her labor go to waste, she eventually relented and signed a contract with one of the companies. (Wiley 2009b)

Prior to the advent of new technologies, academics had little choice but to go along with the trucker's deal in Wiley's parable. And, as Edwards and Shulenburg Shulenburg (2003) suggest, it operated successfully when it was seen as a fair exchange, a 'gift economy', but they claim, 'beginning in the late 1960s and early '70s, this gift exchange began to break down. A few commercial publishers recognized that research generated at public expense and given freely for publication by the authors represented a commercially exploitable commodity'. To return to a theme of this book, what we now have are alternatives to a previously rigid system, and these alternatives are driven by new technologies.

Open access publishing

Before addressing alternatives to the current publishing model, it is important to appreciate the functions it provides, to evaluate whether they are necessary and, if

so, how they can be realised in any new model. Clarke (2007) suggests the following functions beyond the dissemination of content:

- quality assurance:
 - for relevance to the particular journal;
 - for content (semantics) – which would be perceived by many people as the journal's central function;
 - for expression (syntactics);
 - for presentation (formatting and visual style), including 'branding';
 - for discoverability (in particular, keywords and citation format);
- promotion, marketing and selling;
- logistics (i.e. distribution or access, depending on whether a push or pull model is used);
- revenue collection;
- responsibility for contingent liabilities, including copyright infringement, breach of confidence, defamation, negligence, negligent misstatement, misleading or deceptive conduct, contempt of court and breach of laws relating to censorship, discrimination, racial vilification, harassment and privacy; and
- governance.

Geyer-Schulz *et al.* (2003) meanwhile suggest six 'core processes of value-adding activities': content direction, content packaging, market making, transport, delivery support and services, and interface and systems.

Open access (OA) publishing often seeks to effectively replicate these functions of the publishing model but to make the outputs of that process openly available to all. What constitutes 'open access' is a source of much debate, but the ostensible aim is to remove (not just reduce) barriers to access. The Budapest Open Access Initiative (<http://www.soros.org/openaccess>) proposes that by open access literature they mean it's free availability on the public internet, permitting any users to read, download, copy, distribute, print, search, or link to the full texts of these articles, crawl them for indexing, pass them as data to software, or use them for any other lawful purpose, without financial, legal, or technical barriers other than those inseparable from gaining access to the internet itself'. A simple definition is 'digital, online, free of charge, and free of most copyright and licensing restrictions' (Suber 2004).

Inevitably there are variations on 'pure open access' and debates as to whether a particular approach is open or not. For example, many journals which still operate a proprietary, closed approach will permit 'self-archiving' of a pre-print by the author, so they can upload this to their blog or a repository. This route can be very successful; for example, the physics pre-print repository arXiv.org has become the *de facto* reference site for physicists. Some publishers will demand an embargo and exclusivity of a set period (typically 6–18 months) before permitting archiving, which most open access advocates would argue contravenes the spirit of open access, and what length embargo is deemed acceptable? With the advent of good search tools self-archiving means a version of the article can often be found for free, although it doesn't guarantee this, and it relies on individual authors to be willing and competent to self-archive. In addition, if reputation and tenure are linked to citations and downloads from a central database it is not in the author's interest to 'dilute' their statistics from the official ones measured in the publisher's database.

Self-archiving is often termed Green OA, while open access journals are labelled 'Gold OA'. The two are not mutually exclusive; the Budapest Open Access Initiative in 2001 was the first attempt to formalise and mobilise the open access movement, and it proposes that 'open access to peer-reviewed journal literature is the goal. Self-archiving and a new generation of open access journals are the ways to attain this goal' (Budapest Open Access Initiative 2002). Peter Suber (2009) agrees, arguing that 'OA archiving and OA journals are complementary and need to proceed simultaneously, much as an organism develops its nervous system and digestive system simultaneously and cannot do one first and the other second'. Stephen Harnad disagrees, suggesting that Green OA is 'faster' and 'surer' (Harnad *et al.* 2004).

Within the 'Gold OA' approach there are a number of alternatives. A model currently favoured by many publishers is that of 'author pays', wherein the cost of open access to the publisher is shifted to the author. Fees range between \$1,000 and \$3,000 per article although even these fees may not be sufficient to cover current publishing models (Waltham 2009). Having invested heavily in proprietary software systems and infrastructure to maintain a competitive advantage, the cost to existing publishers for open access e-journal articles is calculated at \$3,400 per article. Non-profit organisations, such as professional societies, have tended to choose cheaper software options, such as the open source journal management system Open Journal Systems (OJS), and see a significantly reduced cost per article of \$730 (Clarke 2007).

Although open access publishing is primarily concerned with the problem of access to journal articles, there is a related issue of the underlying affordability of the publishing model. Author-pays models of open access may not be viable to sustain the current model of publishing, but Clarke's cost-analysis work suggests that this may be a result of excessive costs within the for-profit organisations. As he puts

it, 'For-profit publishers have higher cost-profiles than not-for-profit associations, because of the additional functions that they perform, in particular their much greater investment in branding, customer relationship management and content protection.' Few of these additional functions are related to scholarly activity or knowledge dissemination. This raises questions about the additional value that publishers bring to the process. In their paper on the business of scholarly publishing McGuigan and Russell (2008) cite a report from the Deutsche bank, analysing the cost margins of academic publishers and concluding as follows:

We believe the publisher adds relatively little value to the publishing process. We are not attempting to dismiss what 7,000 people at the publishers do for a living. We are simply observing that if the process really were as complex, costly and value-added as the publishers protest that it is, 40% margins wouldn't be available.

Some of the possibilities of publishers adding value will be explored later, but perhaps the key point here is that once alternatives have become available, it exposes the costs that are used for non-scholarly functions.

A strong driver in the open access movement has been the increasing use of open access mandates by research funding bodies. The US National Institutes of Health (NIH) revealed its Public Access Policy in 2008 (<http://publicaccess.nih.gov/>) which required all journal articles that arose from NIH funding to be placed in the open access PubMed archive. Many other research bodies have followed suit across the world. Similarly a number of institutions have set out mandates relating to open access; for example, Harvard's Faculty of Science and Arts adopted a self-archiving policy in 2008. The ROARMAP (Registry of Open Access Repository Material Archiving Policy) site lists all such policies, and at the time of writing 249 institutional, departmental, funder and thesis policies had been recorded (<http://www.eprints.org/openaccess/policysignup/>).

The advantages of open access

In the previous section we saw how cuts in library funding created one form of pressure on the current publishing model. The open access mandates of funders create another challenge. But what of the content producers, the authors themselves; what is their motivation to pursue open access or other models of publishing?

Harnad (2005) suggests six advantages for open access publishing:

- 1 Early advantage – you can publish earlier in the research cycle.
- 2 Arxiv advantage – a central repository (or repositories linked by a common data standard) provides one main place for all publications.

- 3 Quality bias – a self-selecting bias in that higher articles are more likely to be self-archived in the early days, but this effect would disappear as self-archiving approaches 100 per cent.
- 4 Quality advantage – articles are judged on quality and not on access differences.
- 5 Competitive advantage – self-archived papers have a competitive advantage over non-self-archived ones, in early days, although this effect would also reduce as the practice increases.
- 6 Usage advantage – open access articles are read more widely than non-open-access ones.

I would suggest four major motivations for individual scholars to engage with open access, two of which overlap with Harnad's list: citation advantage, the time lag to publication, copyright and alternative publishing methods.

The first is what Harnad terms the 'usage advantage'. There is strong evidence that open access journals have higher citation measures, downloads and views than those in toll-access databases (e.g. Lawrence 2001; Antelman 2004; Harnad and Brody 2004), although Davis (2010) suggests it leads only to increased readership and not citation. In publishing an academic article the author is surely seeking for it to have the greatest impact and widest dissemination (without compromising its quality or findings), and thus given a choice between the two options, the route with the higher potential for reach would seem to be the obvious choice. However, such considerations may be influenced by the range of journals in a particular field and also the reputation of specific journals. These citation improvements usually take into account the green route to open access, self-archiving, so in itself the increased citation effect is probably not sufficient to cause a substantial change beyond the requirement to self-archive.

A second motivation for individual scholars to move beyond their current approaches is an increasing frustration with the time delay between submission and final publication of an article. The process can take up to two or even three years from submission to final publication. Much of this is taken up by the peer-review process, but many journals will still be restricted by the length of each issue and frequency of publication, with many journals only releasing one or two issues per year. The delay in publication reveals a print mentality still in operation in many cases, and for a fast-moving field it renders the journals almost redundant as the main source of scholarly exchange. The advent of e-journals has seen some loosening of this approach, with accepted papers sometimes published online in advance of the actual journal issue.

A related reason for engaging with open access is the copyright agreement required by most publishers. This traditionally signs over the rights of the paper to the publisher (while authors bear all the potential risk of legal action) and places restrictions on the authors' use of their own content. This is an area that has seen considerable change in recent years, when in 2003, 83 per cent of publishers required copyright transfer, falling to 53 per cent in 2008 (Waltham 2009). The standard contract is often the default one provided, with many authors unaware that a less stringent one exists if requested. Many open access journals by contrast operate a Creative Commons licence, whereby the author retains ownership of the article.

The last factor is perhaps the most significant for the publishing model. The preceding three can all be accommodated within the existing model, with a few adjustments. The main reason that academics are beginning to question the publishing model is that they are finding alternative methods for communication, publishing and debate which are more rewarding and have none of these restrictions in place. For most authors academic writing is a creative process, and that personal satisfaction gained from engaging in a creative pursuit is something that can be found elsewhere now. I charted my own publication output before and since becoming a blogger, and found that my annual output of papers halved since becoming a blogger. This wasn't due to the time commitment usurping article-writing time but rather that the desire to write for formal publications waned. Blogging scratched the itch of creative writing and offered more immediate feedback, an opportunity to use a writing style I preferred and more impact in terms of readership. Other academics will have found similar preferences for video, or podcasts or other media. Given the benefits one finds in using a new medium, and that these speak directly to scholarly practice, the traditional journal article begins to seem remote and dry in comparison. Open access approaches seem the best route to acknowledging and utilising these other methods because the article itself is open and can be linked to and merged with other media. How one publisher is attempting to do this is the focus of the next section.

Reimagining publishing

Open access publishing can be seen as a first step in utilising the possibilities of the digital, networked and open approach to scholarly communication. But it is still close to the original model. If publishers merely switched to an author-pays model of open access, then there would be a considerable increase in terms of access, and the funding crisis would shift from libraries to research funders who would bear the brunt of these fees as they are calculated into project costs, but the model would largely remain the same, and some of the opportunities the new technologies permit would be lost.

We can explore what these opportunities might be by looking at some current examples. The first is that of PLoS, the Public Library of Science (<http://www.plos.org/>). PLoS was founded in 2000 as an advocacy organisation, trying to promote open access in science publishing. Although their campaigning gained support, the kind of change they wanted to happen failed to materialise, so in 2003 they set themselves up as a non-profit, open access publisher. Articles are published under a Creative Commons attribution licence, which means others are free to take them and use them, even for commercial benefit, provided they acknowledge the original author. They operate a Gold OA policy, with the author paying for publication, and have been experimenting with the appropriate price. As well as making their journals free for anyone to read, and employing the Creative Commons licence, PLoS also sought to re-engineer the publication model.

They have a range of journals which represent a continuum of experimentation with the peer-review model. PLoS Biology and PLoS Medicine are reasonably traditional, with the exceptions noted above. These are prestige journals, with paid editors and high impact factors. PLoS One is a journal for all areas of science and medicine and represents a more significant break with the traditional model. Its intention was to address the issue of the time delay in the publication process. Instead of the extensive process of peer review, PLoS One operates a more lightweight model which assesses whether the article is generally suitable, that is, whether the work is done to high scientific and ethical standards, is appropriately described and that the data support the conclusions, but makes no assessment of importance. The PLoS One site then provides tools that allow a degree of post-publication assessment, including reader ranking, comments and metrics. Operating this model they have reduced the peer review to about 100 days, compared with the usual one year. In 2010 they published 6,500 articles, and the journal has a high impact factor.

A further departure from the traditional model is provided by PLoS Currents. These aim to significantly reduce the publication time even further and are focused around particular subjects where breaking developments are essential, for example, Influenza. Using the Google Knol web-based authoring tool, authors write directly into the system. This is then reviewed rapidly by a set of experts who the editor gathers around the particular domain. These experts check for obvious methodological errors and suitability, and the work is then published. This model is free to authors.

As well as exploring variations in the peer-review process, PLoS journals have also widened the types of webometrics used to measure an article's impact. Significantly, they focus at the article level, whereas the current measure of impact is at the journal level. They have expanded impact measures beyond just the standard citation measure to include web links, social bookmarking, blog comments and so on.

Another innovation is the development of PLoS Hubs, which act as information sources for specific subjects, such as Biodiversity. These take advantage of open access by aggregating content from elsewhere and connecting the data. So, for example, if a species is named in an article then photographs from Flickr can be aggregated along with population maps, the Wikipedia definition, museum references and so on. The journal article can be seen as sitting at the heart of a network of data, which add to its richness.

What the PLoS example illustrates is that open publishing allows new forms of representation and communication. Being able to remix data and pull together journal articles and other forms of data means new layers of interpretation can be added to them, and crucially this can be done by anyone because of open licences. The result is that journal articles and their associated data will be subject to the unpredictable, generative features of the Internet, whereas their use has previously been tightly controlled.

Willinsky and Mendis (2007) offer a different take on the possibilities of new publishing models. Using the OJS software they report how a small scholarly association with only 220 members was able to establish, and maintain, a new journal at 'zero cost'. The OJS system was used to manage the review process and with the usual volunteer support for editing and reviewing, combined with online publishing using university systems, this example illustrates that the assumptions in the author-pays model of Gold OA can be challenged and that small associations can take control over their own field of publication.

More ambitious models of reforming the publication process are exploring the role of peer review. It may be that authors bypass publishers altogether; for instance, the referencing tool Mendeley allows users to upload articles, create collections, rate articles and so on. It is not difficult to imagine a scenario where authors simply upload directly to this and let the community decide on the value of an article. As highlighted in previous chapters, this could be another example of Weinberger's (2007) shift from 'filtering on the way in' to 'filtering on the way out', whereby metrics, comments, rankings and search are used to determine what information is filtered.

The issue with post-review models is not whether they are feasible (they obviously are) but whether they are desirable. Academics hold the peer-review process in high regard, and it seems to be one of those practices they are keen to retain. Ware (2008) reports on a large-scale survey of reviewers, where the vast majority felt that peer review greatly helps scientific communication and believed that without it there would be no control. There was a suspicion of open review (over anonymous, blind review), and indeed half of the respondents stated that open review would positively discourage them from reviewing. This would suggest that more radical departures from the peer-review model are unlikely, but as the PLoS example indicates it is not

immune to experimentation while still retaining the essential academic function of quality and robustness.

Conclusion

This chapter has explored some elements of the academic publishing business. A number of factors are conspiring to create pressure on the standard model, with a resulting interest in open access publishing. There are strong arguments for open access, most powerfully that the publications are usually the result of tax-payer funding in terms of research or staff time. There is also a strong financial case, with Houghton *et al.* (2009) demonstrating that research funding could probably divert sufficient funds to pay for the Gold OA method to be successful and that the increased savings from both Gold and Green OA would significantly outweigh the costs.

Even without the public good or financial arguments, the case for openness in publication can be made on the basis of what it allows. If we return to Zittrain's (2008) argument that innovation occurs when you have a generative system, then storing journal publications in proprietary database acts as a restriction. The case of PLoS hubs is one example of this, with open data being aggregated around journals. But this is only a start; the key to the generative system is that it is unpredictable. One can easily imagine collections of articles being gathered together, open courses being created around open reading lists, data analysis across articles to explore connections between concepts, visual representations of arguments that link to articles and so on. In terms of scholarship it is this additional layer of interpretation and use that is perhaps of the greatest interest.

The economic and access argument against open access is difficult to sustain, so the question remains why is it that toll access is still the norm and that only a minority of authors self-archive? The answer is that we may well be in a transition state, and the picture will look different in a decade or so. But we should also explore some of the barriers to open access. The greatest of these is the current strong bonds with metrics such as the journal impact factor and the link with reward and tenure explored in Chapter 14. The opportunity to any individual for open access publishing is also a major factor. For example, if a scholar operates in a highly specialised domain, there may only be two or three reputable journals suitable for their work. If none of these operate an open access policy it is a difficult decision to eschew publication in any of them. This is where, as Harnad would argue, the Green OA route is most effective, and if authors begin to ask for this then more publishers will grant it.

I would go further and argue that given the contribution scholars make for free to the business (producing, editing and reviewing the content), we should not

undervalue our work. I have committed to a personal policy of publishing solely in open access journals and also only reviewing for such journals. It is noticeable that when I reply to a request for a review by politely stating my policy it is often the first time the editor has considered the open access model. I would suggest a similar bottom-up approach from scholars in all disciplines would soon effect change.

The primary reasons reviewers gave for engaging in the peer-review process (Ware 2008) were as follows:

- to play your part as a member of the academic community,
- to enjoy being able to improve the paper,
- to enjoy seeing new work ahead of publication, and
- to reciprocate the benefit when others review your papers.

None of these motivations is undermined by an individual open access policy, and this represents the type of action whereby scholars can gain ownership over the key practices in their discipline.

A further avenue of action is to explore further the peer-review model, and how this can be modified, when it is appropriate and what other forms of evaluation are useful. No lesser a figure than the Astronomer Royal Sir Martin Rees (2010) prophesises that ‘arXiv.org archive transformed the literature of physics, establishing a new model for communication over the whole of science. Far fewer people today read traditional journals. These have so far survived as guarantors of quality. But even this role may soon be trumped by a more informal system of quality control, signaled by the approbation of discerning readers’.

An approach that combines this kind of experimentation with the recognition and evaluation of other forms of digital scholarship as detailed in Chapter 11 has the potential to significantly alter both the communication and practice of research. To merely continue with the current model in a slightly modified format would overlook many of the opportunities made possible by a digital, networked, open approach. Christine Borgman (2007) warns that ‘[u]niversities and higher education agencies risk undermining their efforts to reform scholarly communication if they merely reinforce the norms that serve print publication and that preserve the disciplinary boundaries of the past’.