

Open access and publishing

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Open access (OA) is attractive and desirable as a means by which to achieve the goal of improving the efficacy and efficiency of communicating scientific research results. The arguments most heard in favour of open access are, unfortunately, often not very strong or persuasive for researchers in their role of author, even though it is on them, and their funders, that the success of open access ultimately depends. Yet there is an inevitability of open access eventually becoming the norm, merely due to the technological possibilities of the Internet. Both publishers and the academic community should recognize this and create publishing models that satisfy the need for universal access in an economically viable fashion.

When we talk about open access (OA), should we not first define what it actually is? Not really. Open access does not need a definition. It is obvious what it means. The essence is clear from the words themselves. Even so, that has not stopped various groups from defining OA in great detail. I have been involved in several of those groups myself^{1,2}, but I have now come to the conclusion that the definition does not matter. Of course, the lack of a definition may lead – and has led – some journals and publishers to rather spurious claims that they ‘are’ open access. That only demonstrates the success of the concept. Many journal publishers and journal-publishing scholarly societies want to be seen to be in on the act because the rationale for open access is so compelling. And naturally, that leads to cases where what’s in the shop window isn’t quite what’s for sale inside. But they are easily found out, and offering ‘open access’ that is not, is a self-defeating strategy.

What is so compelling about open access? Is it compelling, even? Well, it has been around for the best part of a decade now, and it has not gone away, which is an indication. It has been wished away, and dismissed; denounced, even, but those efforts have not succeeded. It seems that open access is here to stay. That does not mean it has succeeded yet, though, and there are a whole host of vested interests stacked against it. At the time of writing, OA is making progress but is still struggling.

There are strong arguments for open access, but first let me go over some of the weaker ones that, unfortunately, because they can be easily disputed, seem to have been the most prominent in the discussion about open access. An argument often advanced is that open access articles are cited more often and therefore have more scientific impact. This would be good for the author, as citations are the currency of the realm for career progression: promotion, tenure, future funding, etc. Citations – or the lack of them – decide whether a researcher thrives, vegetates, or perishes in the scientific ‘ego-system’. Open access articles may indeed be cited more than comparable articles that are not open – though one preliminary study seems to point to a reverse cause-and-effect relationship³ – but if this effect exists, it can only be a temporary one. If the majority of articles are OA, the effect has become meaningless. In the meantime (it can, after all, still take quite a while before the majority of research articles are OA), this difference in citation impact may have some peculiar consequences. If the phenomenon were real and substantial, ‘pedestrian’ open access articles would have a greater impact – and with it, an association of higher quality – than genuine high-quality articles that are not open. Personally, I have no problem with that. I am not a great believer in the idea that more citations mean higher quality. And, optimist that I am, this phenomenon may speed up the demise of the strong perceptual – but misguided – link between impact factor and genuine quality, which is so often the basis for promotion and tenure decisions and the like, and

has become quite a poison in the scientific ego-system. Citation impact advantage is just not a very strong argument for open access. If it were, authors would beat a path to the door of journals that offer open access, and they don't yet.

What about the argument that the general, tax-paying public benefits from, and should have, free access to the science literature, since their tax contribution paid for most of the research? This is also not a terribly strong argument, although it may grow stronger in areas like medicine and perhaps environmental science. The fact is of course that most scientific research is rather inaccessible (intellectually) for the lay person, even if he or she had access to it (physically). The idea, expressed by one or two traditional publishers, that the general public should be shielded from the research literature is a silly one, probably expressed in the heat of the debate and not meant seriously⁴, but the idea that substantial sections of the general public are likely to take an interest in this literature is also far-fetched. Some exceptions, as mentioned above, may be found in areas such as medicine and environmental science. Richard Horton, editor of *The Lancet*, once remarked during a conference that trends in the cost of medical care are likely to lead to the necessity of a much greater role of guided self-management by patients of their health conditions, in order to keep the enormous costs of healthcare to society under control. That seems to make sense, and it is clear that comprehensive access to the source material in the medical literature would be greatly beneficial, at least for those who do the guidance and the outreach.

A stronger argument for open access is that it increases the efficiency of scientific discovery. The likelihood of wasting resources and time on duplicate investigation decreases when researchers have comprehensive access to the results of earlier work. 'Cross-fertilization' between disciplines and specialities would also be enhanced. Hypothetically, this comprehensive access could be provided by the traditional publishing model, but it would require that every research institution in the world had access to all the relevant and potentially relevant literature. The realities of the traditional model make this impossible. There is, arguably, not a single institution in the world that has access to all the literature that is, or might be, relevant to the research carried out there.

But the strongest argument for open access is simply that it is possible, now that the Internet has reached a level of stable maturity and reliability. Add that to the benefits of OA and the case is compelling. The question is not 'why open access?' It is 'why not?' Would you make numerous trips to the compost heap at the back of your garden to move a pile of leaves or grass clippings from the front by the handful if you have a wheelbarrow and could do it in one go? Well, you might, but it is not efficient. Easy-to-use technology that makes the burden lighter has always been persuasive to humans. There are no technical barriers to open access, just barriers of habit, such as restricted-access business models based on the legal construct of copyright. Ironically, copyright was originally conceived as a way of encouraging the dissemination of scientific knowledge, not of restricting it. Open access is such a powerful concept that the small, but growing, number of people who see its strength will find ways to get it, by hook or by crook. A way that is gaining popularity is to subvert the traditional publishing model by just posting a version of the published article on an open web site or to deposit it in an open repository. A version of this – with delayed, embargoed open access – has just been codified into US law with the recent National Institutes of Health (NIH) mandate on NIH-funded researchers to deposit the final manuscript of their published articles in the open repository that is PubMed Central. The attraction of this is that it can be done relatively easily and does not have to cost much, since the publishers – who do a lot more than just giving access, of course⁵ – have already done all the publishing work. The question is, can publishers adapt their models and deliver OA as part of what they do?

If it is just access that authors and the scientific community want, they need not bother publishers. They could just post their articles on some web site or repository. But it is not just what they want. They want their articles officially published, of course, as their informally published versions on the web are rather less than useful for scientific recognition and career purposes. And that means that they are asking the publishers of journals – by submitting their articles – to organize their acquisition of an official 'badge': a journal reference. Yet if publishers leave the open access terrain fallow, and stick to traditional models, it is inevitable that authors follow the traditional route, but eventually post a version of their published article on some open site anyway (whether or not compelled by their funders), attach the journal 'badge' just by mentioning the article's reference details, and by-pass the access restrictions the traditional

publishing model imposes. Many publishers, and some open access advocates, currently seem to think that this will not jeopardize their subscription income. Who knows? If those publishers lose that bet, they lose their shirt. Some take a more cautious, and sensible, approach. They offer authors the choice between the traditional and the open access model. They give themselves and the science community an opportunity to make the transition and get accustomed to a different kind of economic underpinning of the service of publishing in the era of electronic dissemination on the Internet.

The impact of the Internet on the environment in which scientists communicate and in which science journals are being published is enormous and fundamental. Being a geologist originally, I see an analogy here to the impact of the meteorite on the environment on Earth which precipitated the end of the era of dinosaurs. Some of them survived. Not the largest, not the strongest, but the most adaptable. They evolved into animals that include some of the most beautiful and plentiful creatures that exist now: birds. Publishers who recognize the impact of the Internet on the environment in which they work, and who are willing and able to adapt to the new environment, have a very good prospect of surviving and thriving.

Open access publishing is a response to these fundamental changes in the environment. But what are those fundamental changes actually? Well, they go to the heart of what publishing is commonly understood to be: dissemination of information. The central role of science publishers has always been associated with dissemination of information – though that role is central more in perception than in reality – and that is reflected in the traditional business models employed, in which income is mainly, often almost exclusively, derived from subscriptions. It is more in perception than in reality because science publishing has always been about a lot more than dissemination. In the whole process – from submission, registration, via the organization and facilitation of peer review and editorial judgement leading to a kind of official certification and a unique reference, to copy-editing and redaction, dissemination in formats suitable for consultation of the literature as well as for archiving, and embedding in the literature via inclusion in appropriate abstracting and indexing services – dissemination is just one of the many functions performed. Dissemination, however, is the one on which the economic value of a publisher is built. This is unfortunate for publishers in the new environment of the Internet, because dissemination is the one function that can now very easily and cheaply be performed by many others, including the author. It is also unfortunate, because none of the other functions of the tremendously useful system of journal publishing makes a significant financial contribution to its economic viability. Voilà: das Problem!

If a method could be found to attach economic value to the other functions of scholarly journal publishing – or, rather, to get their economic value recognized – the vulnerability of complete dependence on dissemination could be lessened considerably. That is if the *service of publishing* could represent its value rather than the *published content*. The method is ‘author-side’ paid publishing and it entails asking authors for a financial contribution for performing a service to them instead of selling these authors’ content to libraries, sustained by, if you wish to put it in the same terms, the traditional ‘reader-side’ payments. This is commonly known as open access publishing. The ‘open access’ here is a consequence of the model. If publishing is a service to authors and is being paid by them or on their behalf, there is no need for getting income from readers, and any financial barriers to providing access disappear. Indeed, it becomes part of the service to authors to maximize the article’s visibility, and open access is an indispensable tool to achieve that.

The mechanics are easy. The publisher does virtually everything he used to do, including facilitating the peer review and editorial judgement, and if the article is accepted, gets paid for his efforts by the author and makes the published article freely available online for use, re-use and redistribution. Print versions, where there is demand, he makes available at a price based on the cost of, and resources required for, printing, handling and postage. Copyright can stay with the author, as in this model it is of no use to the publisher. Even printed versions can be freely photocopied or scanned once the cost of publishing and printing are covered. The only necessary condition is that in case of any re-use or redistribution, the author is properly recognized by the re-user or redistributors: an extremely small price to pay for anyone who wants to use open access literature, if one can even put it in those terms.

But how easy is it to get recognition for the economic value of the publishing process outside dissemination *per se*? That recognition certainly is not very widespread yet. Fortunately there are signs that it is coming. It comes from leading funders of science, such as the Wellcome Trust⁶. Both on the

Wellcome Trust web site and in a document known as the Bethesda Statement which resulted from a meeting convened by the Howard Hughes Medical Institute, we find the recognition that publication of results is an essential part of scientific research and the cost of publication is part of the cost of doing research. That notion is a meme that is propagating itself, particularly among funding organizations. Slowly, perhaps, but steadily.

John Willinsky⁷ makes the strong point that openly accessible scholarly information is more valuable than information published in journals with limited access. A very valid point. Yet if his point is valid indeed, why is it that there are still plenty of members of the academic community, including OA advocates, who somehow balk at the idea of willing, OA-conscious publishers charging for the service of open access publishing? Isn't what one is prepared to pay for something an expression of its 'value'? So why is Academia prepared to shell out for subscriptions, but reluctant to pay for the article charges that come with OA publishing? In the aggregate, and in the traditional subscription model, Academia spends an amount in general far exceeding US\$3,000 for every single article published in established journals. Why not spend that money on publishing all those articles with open access? And get more value to boot? Or is Academia just too anarchic to be sensible about this? Or is open access being held back by the innate inertia of bureaucratic processes? Is the shift of funds from one budget, the library serials budget, to another one, the research budget, too difficult? Or is the unavoidable shift in the distribution of costs between faculties and between institutions – the one that comes with the shift from paying on behalf of the reader to paying on behalf of the author – the hurdle that is too difficult to overcome?

Willinsky also makes the case that an 'aggressively competitive role' that commercial publishers play in academic publishing has had a negative impact on access for everyone. In contrast to the previous point, this is not such a valid one, for three reasons: 1) open access publishing on a sizeable scale was first being offered by a private, for-profit publisher, BioMed Central, and the open access option is also being offered by Springer (for all its almost 1,700 established journals) and other commercial publishers (for part of their journal portfolios), which is very far indeed from being matched by the combined not-for-profit publishing sector; 2) not-for-profit journals do not really exist in any numbers – most so-called not-for-profit journals are expected, by their not-for-profit publishers, to make a handsome return (often called 'surplus', which is distinct from 'profit' only in that it is not taxable) to be used for other purposes, which mostly have little or nothing to do with the journals themselves; and 3) some not-for-profit publishers are amongst the most vocal opinions heard against immediate open access⁸.

The way forward for open access must be a value-based, economically sustainable, travel plan: neither one that takes the profit or tax status of journals and publishers into account; nor one that makes journals dependent on uncontrollable forces from outside funding excessively liable to ulterior motives⁹ (such as is sometimes the case with advertising); nor one that relies too much on journals with hidden subsidies run by well-meaning, but vulnerable efforts of volunteers or amateurs, which seemingly have no costs and therefore no need to charge anybody – whilst there is a place for those journals, that model is not scaleable to the tens of thousands of journals that make up the scholarly literature.

The 'author-side' payment model of open access publishing neatly fits the bill. That said, it has its flaws, too. The author-side payment model, as we witness it now, loads all the costs of the whole process of peer-reviewed publishing on the published articles only (just like the subscription model). A fairer system would be one of submission charges, levied on all submitted manuscripts, whether they be accepted for publication after peer review or not. A bit like exam fees. You pay whether you pass or not. It would ensure that very selective journals would not have to charge excessive amounts per published article. It would encourage authors to 'pitch' their article at a journal of about the right level for it, thus avoiding too much 'cascading' down the journal pecking order by initially aiming too high and having to go through a series of submissions and rejections before being published. The 'waste' of peer-review effort would potentially be vastly reduced. However, though submission charges may logically be the right thing, I feel that 'psycho-logically' they aren't (yet).

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