

Open access publishing – is it the future for scientific journals?

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In the 'traditional' model of scientific publishing, authors submit a paper to a journal, and if it survives the rigours of peer review, it is copy-edited, typeset, printed and distributed in the next available issue to individual and institutional subscribers. The publisher's income from subscription sales covers the costs of review, production and distribution. This model translated into the electronic age: access to the online version of the journal is restricted to subscribers. However, there have been two main criticisms of the model, one financial and one technological.

In a study of US periodicals, subscription prices rose by an average of 9.5% annually over the past 16 years, compared with an average rate of inflation of 3.1%. Some of this has been justified by page number increases and the additional costs of online publication. However, the university library budgets have not increased by anything like 9.5% a year. This has led to the so-called 'serials crisis', in which subscriptions have been cancelled, and publishers have put up their prices even more to compensate for the lost income: a vicious circle that reduces the availability of articles to the average reader.

In considering pricing, it is important to distinguish between journals produced by the not-for-profit sector – learned societies and many university presses – and the for-profit commercial publishers. Many of the latter operate with very high profit margins in their journals businesses, much of which is channelled to shareholders and out of the research and educational sector. A small survey of microbiological journals showed that those produced by commercial publishing houses cost between 3 and 5 times as much per printed page as those published by learned societies such as SGM.

Of course many learned society publishers do make a profit (tastefully called a 'surplus' in the not-for-profit sector) on their journals; for many it is a major source of income alongside membership fees, investment income and meetings registration charges. In SGM's case, the journals surplus funds the Society's charitable activities, such as student grants, support of meetings, educational and public affairs work and so on, and is recycled to the benefit of the academic community.

The technological objection to the traditional subscription model is that it perpetuates 19th century methods; surely the advent of the internet offers new opportunities to making the scientific literature as freely available as possible. This thought, together with a growing backlash in the academic community to rising journal costs, has led to the development of 'open access' experiments. These range from online publication of papers on individual or university websites, to free online journals such as Public Library of Science *PLoS Biology*, or the BioMedCentral (BMC) journals on PubMed Central.

Such journals have production and maintenance costs which have to be recovered, generally by an 'author-pays' mechanism, in which the author (or the institution) pays a fee for publication. Different free access publishers are trying different models: some charge a flat fee per published article, others charge a submission fee for all articles, including those eventually rejected, as well as a publication fee. At the most complex, one publisher is proposing to charge both of these fees, plus extras per

word, figure and table! No one knows at present whether these models will be economically viable in the long term, and acceptable to authors. *PLoS* charges \$1,500 per article, but this appears to be subsidized from a \$9M start-up grant from a charitable foundation. BMC charges \$500 per article, said to be well below the economic costs of production. Several learned society publishers have calculated the true costs of publication, including a small element of surplus: most come up with an average fee of around \$2,000–3,000 per article.

The subscription and author pays models are the extremes of a spectrum, and there is actually a lot of overlap in the middle. Many traditional journals have had page charges for years; many charge extra for colour illustrations. These are examples of author-pays within the subscription model. SGM has traditionally been against page charges, and offers free colour where scientifically justified.

Many subscription journals make back content freely accessible, such as articles more than 12 months old in SGM's *Microbiology* and JGV at HighWire. The 346 journals online at HighWire have made a total of 668,000 articles freely available. This contrasts with a total of 30 research articles currently on open access in *PLoS Biology*.

In a hybrid experimental model the basic subscription system remains, but authors can choose to pay a fee to have their article free online from the time of publication. Again, the fees seem far below the true costs of publication: will this approach yield robust conclusions about its value for migrating from a subscription to an open access model?

SGM will obviously be monitoring the situation as the different business models develop, and considering whether SGM should change its procedures. The strategy will need to balance the different objectives in publishing: attracting authors to submit their best work; keeping the support of scientific editors and referees; securing wide dissemination to readers; maintaining scientific and production quality standards; ensuring archival permanence and accessibility of work published online, and retaining economic viability. The subscription model has achieved all of these objectives short of completely open access; the author-pays models still have to prove themselves.

In the meantime there are many intriguing questions. Will open access journals attract a significant flow of quality papers and build up respectable impact factors, or will the author payments relegate many of them to the level of vanity publishing? Will there be a transfer of budgets from librarians to authors, and a redefinition of the role of librarians? How will commercial publishers react? If author self-publishing on personal or university websites becomes commonplace, will there be an erosion of the quality standards that the established journals have built up? Recent discussions with other publishers have made it clear that there is no single industry view of how things will develop, but most people expect the landscape to be different or at least more varied in future.

More reports from the Marlborough House crystal ball will follow. Views from members would be welcomed.

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Publishing journals is a core activity of the SGM and funds many of its charitable activities. But times are changing. Ron Fraser explores the issues facing scientific publishers as they strive to maintain both income and a quality product in the online era.