

Six Flavors of Open Access: Successes and Possibilities for Stm Journals

by ANN OKERSON

INTRODUCTION/BACKGROUND

A broad commitment among participants in the scientific and scholarly publishing community to achieving the widest possible access to the literature has begun to bear fruit. Many of the players have had this kind of commitment all along, for example, through sharing around of preprints in physical sciences disciplines. As everyone knows, Paul Ginsparg's e-print server, arXiv, started in 1991, when he automated the high energy physics community's pre-electronic article-sharing practices, creating a mechanism for these articles to be submitted and mounted on a server. In turn, this innovation led the way for other disciplines; it is estimated today that perhaps 140 e-print servers from small to large-scale exist. [1]

Libraries have also demonstrated an energetic access commitment. This shows in various ways: through the tradition of most libraries to provide on-site access to their collections; to circulation of materials; and to books and articles being delivered through interlibrary loan. In the United States, these practices have been codified in the Copyright Act, Section 108, with limitations being placed via both law and negotiated best practices.

The success of the Internet for communications and distribution of information challenges all of our prior assumptions about the way access will work in the future. For example:

- Do the definitions of "widest possible access" need to remain as they have been in print?
- Do the costs of publishing journals, if new technologies are astutely exploited, need to remain at today's levels?
- Should libraries and library budgets have a future role as the aggregators of resources on behalf of the research and educational communities?
- Should the value-adding features of journal publication continue as we have known them?

A number of voices would answer more than one of the above questions with a resounding "NO." These days, in most conferences and meetings, emotions run high. People on panels such as this are chosen perhaps because they have the "right" point of view, or else one so annoying as to cause heated debate and awaken the audience!

Intelligent and well-meaning people can be found on different sides and continuums of the questions above.

I spend a lot of time thinking about all these matters and what the role of my university and profession should be in these exciting times, so full of potential and also so full of pitfalls. Should things change? That is a silly question -of course they should and they are. Is change inevitably chaotic or is there any way to direct some parts of it and learn from it?

THE SIX FLAVORS

As soon as we begin to talk about Open Access, however, we discover that it is a treat that comes in many flavors, like ice cream. [2] I love ice cream, especially in the summertime, so perhaps that makes me a good person to review the different flavors and talk about their merits and possibilities.

For, to speak seriously, the term "open access" has taken on multiple mutations or flavors and when people argue about whether OA is "good" or "bad," it often turns out that they are arguing about some different things. Also, it becomes possible to argue whether or which variants are real OA or some new, sneaky publisher practice that sounds good but is intended to leave us all worse off than before. For example, has an STM journal publisher really had a change of heart when he issues a press release trumpeting a commitment to some flavor of open access, or is said publisher engaging in the time-honored business practice of giving away as much as plausible in order to sell as much as possible? Trying to guess at, or even to understand, others' motivations is probably a dead end.

What I will do here, then, rather than select a position and argue for it, is to review the successes and possibilities of the present moment. To start, let us assume an ideal well beyond anything we can achieve now: that ideal is full online access to all research materials everywhere, materials of the highest quality, from the moment of publication, 24 hours a day, 7 days a week, 365 days a year, in perpetuity. Measured against that ideal, I will identify (1) initiatives that have shown success (such as: partial open access, open access for developing nations, and delayed open access) and (2) those that are actively objects of experiments (author-pays, institutional repositories, and self-archiving). Then I will conclude with some predictions and some cautions for the long-range future.

1. Partial Open Access

This model is in some ways very old, for publishers have long practiced giving away some kinds of access to their materials while insisting on recovering income for others. As noted above, the protected status of libraries in the US Copyright Act indeed *requires* publishers to cooperate in that particular form of open access, and the economic system of "big science" publishing has grown up around the assumption that this extension of access will be part of the system. Today, many publishers differentiate forms of their publication or the ways they allow access. We see this on the web all the time in periodical sites (for example, *Salon* magazine) that offer some content freely to all but then charge for 'premium content.'

In scientific publishing, perhaps the best example is the report publications of the US National Academy of Sciences, which has for several years experimented with mixing free access and paid access. For example, for some time the National Academy Press (NAP) has posted the full text of their reports for free access to all, charging for the traditional print books themselves. Now, according to an April 2004 press release, the NAP appears to be charging not only for the printed books but also for printable PDF files, while continuing to allow free and open access to HTML files; developing nations are excepted from all PDF payment. NAS follows the history of their publications closely and will monitor carefully the impact on revenue and use of this revised arrangement. Given that NAP is starting to charge readers for something they used to receive for free, this arrangement has attracted negative comment - but it must be admitted that if the present arrangement had come about replacing a prior policy of charging users for all forms of access, it would be hailed as a major step forward. On some level, this partial access is open access: a version free for all everywhere, as likely perpetual as the National Academy itself may be.

By the way, according to announcements on its web site, the British Medical Journal (BMJ), after 10 years, is re-instituting subscription fee to its online customers as of 2005; the exception being for developing nations, whose users will receive immediate free access. After an unspecified period of time, free access will continue to be made available to all readers. The reason is cited as rapidly declining library subscriptions and loss of revenue.

2. Delayed Open Access

Another way in which publishers have traditionally segmented their market is by delay. The hardcover book that sells for \$29.95 when published today may become available - with exactly the same content - in a paperback edition selling for \$6.99 a few months later. The notion of differentiation by delay underlies contemporary STM journal experiments in which publishers - here the journals published by HighWire Press are probably the most consistent example - commit to making their publications freely available on the web after a specified period of time, typically 6 or 12 months. Customers who pay for the journals on this model are those for whom the currency of new information is of high value. Here again, given ubiquity and perpetuity of access, we

come very close to the ideal of open access, bearing only the limitation of some delay. The argument in favor of this form is that it allows a proven business model to continue functioning, while going a very long way towards facilitating access. The argument by some against this model, of course, is that it does not go far enough. To resolve that disagreement, one would need a way of thinking about the value of information in its most current form, a value that would probably vary sharply from one discipline to another and from one user to another.

3. Open Access for Developing Nations

Over the last handful of years, a wide variety of arrangements have been announced and implemented by scientific and scholarly publishers to the advantage of residents of developing nations. This practice typically involves making journals that would otherwise be electronically available only to subscribers freely and openly available to residents of a defined set of nation states. The definitions of "developing nations" can vary (mostly according to published lists or per capita annual income) but all emphasize the most economically challenged nations of Africa, Latin America, and Asia.

The arguments in favor of such a practice mix the noble and the ignoble, depending on who is arguing. The noble argument holds that, just as we seek ways now to make prescription medicines available at affordable prices to the neediest peoples, so we can and should make scientific information available to those who would otherwise be unable to afford the prices paid by more affluent institutions. The ignoble argument holds that in many countries the revenue-generating market is trivially small by comparison to what it is in "first world" countries. It makes sense, therefore, to do away with the cost and bother of managing subscriptions to clients in those countries. Given the near-zero costs of electronic distribution, the loss to net revenue for a big publisher is arguably trivial - and some suspect that perhaps publishers have actually been losing money in those markets anyhow. For technical reasons, people in many developing countries are still unable to gain access, but the increase in scope of availability is nonetheless significant.

4. Author-pays Open Access

Author-pays is the most ardently advanced form of OA for journals that continue to rely on the model of the established publisher and the long-existing journal style. That is, author-pays advocates do not much imagine a change in players or journal value adding; they argue that only one change needs to be made: i.e., the journals need to be funded in essentially a different way. Advocates reason (1) that authors rather than readers are the primary beneficiaries of article publication; and (2) that much research is funded by government grants that could more fully support article publication. Models that depend on users to fund the publication should be abolished in favor of reliance on some form of payment from authors who publish in the journals.

Proposals for author-pays vary in their approach. Most are not dissimilar to the long-familiar "page charges" - wherein authors pay for part or all of the costs of publication, typically on a per-page-published basis. In the past, this funding approach was common

among not-for-profit learned society publishers and infrequent among for-profit commercial publishers. In recent years, learned societies have tended to move away from page charges, arguing that by so charging, they put their journals at a disadvantage in attracting the best submissions.

Note that there is now developing a variant on the author-pays form of article funding, namely "institution-pays". In this variant, large research institutions (or their libraries), which house many scientists who would publish in top quality journals, are offered a "bulk rate" or "membership" - a flat fee that allows all their scientists to publish in the journal at no additional charge or at a discounted charge.

It is only fair to say that the author-pays model must be listed among the maybes rather than the successes. Several changes must take place for this model to succeed.

1. Some pilot journals must show sustained success in attracting top quality articles and in maintaining themselves in business on the revenue stream generated by their model. One of those pilots at the moment is functioning on a substantial grant, provided by sponsors. This gives the journals a small number of years in which to prove their concept's worth.
2. Authors and institutions must find solutions to the question of organizing payment. Will funding agencies be willing to support publication through the grants that support research (without reducing the funds available for direct support of research)? Will research institutions be able to identify indirect cost recovery dollars from research grants that can be redirected to support scientists? Can libraries take current subscription dollars and use them to support institution-pays or author-pays science? Can the overall system sustain the potential loss of revenues that are now derived from private sector customers who may or may not directly engage in research but consume the output of the world's science enthusiastically and at high prices?

(To speak only to the library question, which impacts *our* library's budget: I am concerned that these new model journals will, while they compete with traditional model journals, have the effect of increasing the overall cost of access. We will have some difficulty justifying to the university's leaders a decision to devote funds to unproven new model journals on the *hope* that the cost of traditional model journals will begin to go down by a comparable or greater amount sometime in the future.)

3. It is (the?) early days to understand the longer-term costs of maintaining quality journals and so not easy to know what to charge authors (those who can and will pay). Will one up front payment sustain an article and surrounding apparatus over time, given that no further revenue will be collected in any way, because every use will be fair use?

5. Creating Institutional Repositories

To what extent, some ask, are publishers and journals themselves necessary? Can research institutions eliminate middle men and become their own publishers? Some of the most committed enthusiasts for open access believe this can and must happen. The view is that, whether placed in traditional journals or not, articles by scientists ought to be posted to online, indexed, searchable repositories managed by their institutions. The underlying notion is appealing one and, in a way, reverts to the old model of the University Press, where a small shop produced and distributed the books and journals of the university's faculty.[3]

Many advocates of this solution probably hold that in the end, ubiquitous access to research results so published would allow users to think about suspending subscriptions to traditional publications, which would then either disappear or diminish in number and cost. Here again, there are challenges from funding the new while continuing to pay for the old. Interestingly, what had once been a hotly controversial preliminary question - whether traditional journal publishers would allow authors to house their published articles in institutional repositories as well - seems to have been resolved with (an) official policy decision of Reed Elsevier to allow its authors to self-archive both pre-refereed articles and refereed postprints, a practice Elsevier Science had (mostly) quietly permitted earlier. Though some critics hold that the limitations Elsevier has placed on this right could be crippling, some other of the leading advocates of open access have hailed the Elsevier decision as a great step forward.

6. Self or eprint archiving

The oldest model in use of electronic open access is also the most open to continuing question. As noted earlier, the archive created at Los Alamos by Paul Ginsparg in 1991 (winner of a prestigious MacArthur Fellowship, Ginsparg is now at Cornell), has been a success in its and other disciplines. The archive itself can't necessarily be a success for other disciplines, but its model could be. But the eprint model has still not scaled globally and there are important pockets of resistance. Eprint archiving seems to raise the touchstone question that distinguishes believers in ideal open access from a more pragmatic group. To explain this view, I must move to my concluding remarks.

CONCLUSION

In conclusion, let me encourage us to lift up our eyes from the current scene and look out ten years. What do we really think might happen in that time? Views differ - of course!

Some pessimists hold that if we do not succeed in the fight for full open access, giant traditional publishers will once again swallow us all in their maw and we will live in a world much like the present one, only more expensive. One reason that I am not counted

among the believers in the most ideal form of open access is that I am not a pessimist of this kind.

Another kind of prophet (pessimist or optimist?) thinks that the existing system of scientific, technical, and medical publishing will wither away, to be replaced by a world in which information becomes free and where something like a mix of institutional repositories and self-archiving, with some certification overlays, will suffice to serve the needs of scholars, scientists, and students at a level of quality as high as that we now enjoy. For this to come to pass, the possibilities outlined above all must succeed at a high level, and, in particular, need to achieve a near-universality of success that attracts the vast majority of authors to use their new models. We can and should welcome experiments that explore that set of possibilities.

But if, as is probable, neither extreme emerges the winner, then the likeliest outcome will be something in the muddled and diverse middle. Imagine the possibility of a world in which existing publishers (joined, of course, by new entrants of many sorts) survive, thrive, and redefine their business plans. They eliminate or move to OA the marginal (highly specialized) journals and concentrate on providing new services around their best products - sophisticated indexing, searching, knowledge management, and other possibilities we do not now fully imagine. That is, an appreciable number of publishers, each exploring their own particular markets - and publishers all have two important markets, authors and readers; they must attract the best of both - take steps that provide integrated access and services, for a cost, to their and to OA journals in ways equal to the best we now imagine and perhaps better still.

At the same time, let us assume universities and research centers will take more interest in organizing and managing the output of their scientists and scholars, moving towards the institutional repository model, gradually, at different speeds in different institutions, depending on local needs and uptake, adding a commitment to management of full text.

Given the rich array of future options before us, at the end of a ten-year future history we are most likely to find ourselves in a place more diverse and muddled as today's, and doubtless with its own controversies. I hope that in outlining such a chaotic future, I suggest ways in which the future for users of scholarly information will be appreciably better than the present. Most of us do, I am sure, share the desire to see the broadest possible access to the best possible information. If we do not achieve utopia, we can still take pleasure in reaching a better place.

May I offer a few last remarks? The biggest variable in prophecy in this area is not connected to the elaboration of specific experiments or business models, but rather to the vulnerability of today's large, expensive, and contentious journal enterprise to substantial exogenous events. What if either economic circumstances in the global economy or unanticipated challenges to the business model of the traditional commercial publisher

should drive one or two of the giants unexpectedly out of the STM journal business? Or, what if unfortunate circumstances were to divert further funding from research and social programs to defense and battles against terrorism? Would wars and rumors of wars so far constrain funding for institutional research and science that we would be challenged simply to maintain current models, accept the loss of many journal titles, but labor hard to maintain the best we can? There is not much that any of us can do to affect such possibilities, and we would doubtless all share in painful consequences of realignment, should the negative unpredictable come to pass.

Even putting aside the intrusion of world events, there is always the wild card of the talented entrepreneur. Someone, and probably a single individual, not a committee, may see an opportunity to restructure the entire environment, as Bill Gates did to computing.

At this point, I realize that I am leaving behind the domain of the conference paper or ice cream critic and beginning to practice an alternate career as a political journalist or thriller writer, so I will restrict myself to saying that the uncertainties that finally surround the landscape in which we work are more substantial than we might imagine, and that we cannot depend on wishes or prophecy to select our *next* course of action for us. Instead, we are constrained to think about steps we can take, with existing resources, which responsibly and successfully can move a large system collectively forward in multiple ways: improving the quality of the intellectual product by supporting good science; improving the quality of the intellectual product by supporting technological innovation in forms of presentation and dissemination of information; and improving the quality of the intellectual *experience* of the product by bringing the greatest benefits to the widest possible audience.

If we had only one task, our lives might be simpler: we have many tasks, and so we are very unlikely to know what "simple" means - at least in our lifetimes!

NOTES

1. It is worth noting that other fields, such as the biomedical sciences, did not have a preprint tradition and its scientists are not much using new technologies to create article distribution mechanisms.

2. For the metaphor, thanks to John Willinsky, whose article I discovered quite fortuitously and accidentally after having finished this text: "The Nine Flavours of Open Access Scholarly Publishing," in the Journal of Post Graduate Medicine (JPGM), 49(2003)3, 263-267. Available from:
<http://www.jpgmonline.com/article.asp?issn=0022-3859;year=2003;volume=49;issue=3;spage=263;epage=267;aulast=Willinsky>

3. Today nearly all university presses are in deep trouble, with cutbacks everywhere.

WEB SITES REFERRED TO IN THE TEXT

ArXiv e-Print Archive. <http://arxiv.org/>

BMJ - British Medical Journal. <http://bmj.bmjournals.com/>

Developing Nations Initiatives. <http://www.library.yale.edu/~license/develop.shtml>

NAP - National Academy Press. <http://www.nap.edu/>