

The Impact of Open Access on Academic Libraries

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Introduction

Broadly defined, open access makes scholarly materials accessible to users at no cost. More specifically, the term is used to describe a model of scholarly communication in which users may freely view, download, copy, and print scholarly articles, books, conference proceedings, squibs, and so forth. Such a model is in stark contrast to existing models of scholarly communication in that many of the most widely-used peer-reviewed journals are accessible to libraries primarily through expensive bulk package plans, forcing libraries to pay top-dollar for the resources their faculties require. In so doing, libraries add to their collections a number of rarely-used journals of minimal impact and value simply because they were bundled in with the journals they could not do without: a model not unlike those provided by the local cable company – i.e., if one wants the Food Network, one is also saddled with the Golf Channel.

In actuality, there are a number of different models of open access that adhere more or less to the principle of providing scholarly materials free of charge. Tenopir (2004) explains that open access:

"includes many publication and distribution schemes. E-journals that are published, distributed electronically, and subsidized by universities, government agencies, and volunteer organizations are the most common. In addition, collections of separate articles or research reports could fit the definition, including e-print servers such as arXiv.org, institutional repositories, and author web pages." (p. 33)

The numerous models of open access may typically be categorized under one of the two rubrics proposed by open access champion, Steven Harnad. In the "gold" open access model, materials

are freely and immediately provided in universally accessible electronic journals. The "green" open access model might be seen as an intermediate phase between current fee-based access models and the gold model, in which authors continue to publish in journals, whether they be print-based or electronic, but deposit copies, perhaps pre-prints, into an institutional or subject repository (Crawford, 2005b).

There are thus many forms that open access publications may take, each having its own costs and benefits. What they share is the very general principle which is poignantly stated by Harnad; "the objective of open access is to maximize research impact by maximizing research access." While the benefits are many and clear, the issue of cost is one that has to be agreed upon.

Open access publishing typically implies that the user is able to freely access scholarly materials because the price of publication has been assumed by another party, usually the author of the material, the author's institution, or the grant which funded the research (Tenopir, 2004). One can see that open access publication is not, therefore, a completely cost-free endeavor. Indeed, the costs have merely been shifted from the consumers of information to the producers, or those who fund them (Wren, 2005), which applies equally to both the gold and green models of open access.

It is observed in this paper that all flavors and forms of open access impact the roles filled by academic libraries, but it is worth noting that these may vary. For instance, while the green model of open access will undoubtedly benefit scholars by globally providing scholarly material at no cost, with no access restrictions, other benefits such as budget relief may not be realized (Crawford, 2005b). In fact, it may strain budgets that are already being stretched by

commercial journals.

The scope of this paper is limited to academic libraries primarily because of the close relationship they have with university faculties, i.e., those who both contribute the most to scholarly journals, and have strong needs for access to same. Many of the impacts discussed in this paper might also apply to public, school, and special libraries, but the scope is limited due to the proximity academic libraries have to the world of scholarly communication.

It is not the intention of the author to paint a simple, rosy picture of the issues surrounding open access, nor to advocate a radical, wholesale shift thereto. Rather, it is suggested only that the issues surrounding open access be brought out into the open and discussed. While there are reasons academic libraries might be cautious about modifying the ways they support scholarly communication, there are myriad reasons to consider how they might best serve their communities with open access.

Why Should We Care About Open Access?

The question of why academic libraries should care about open access bears asking. While the growth of open access presents a number of challenging hurdles to academic libraries, there are a number of notable benefits that it offers as well. Moreover, it seems clear that this is no longer a subject to be read about and debated; open access has arrived and is being rapidly adopted.

Gass & Doyle (2005) describe how the evidence for the growth of open access is developing along two fronts, both "the increasing number of agencies and foundations that have

begun to require or encourage free online access to publications based on research they have helped finance and the growing number of journals that allow authors to make their papers freely available" (p. B13). One such agency to do so is the U.S. National Institutes of Health (NIH), which is requesting that all of the research they fund be submitted to NIH's PubMed Central database within one year (Kaiser, 2005). Open access journals have become increasingly indexed beside their commercial peers in online databases such as ISI's Web of Science. As quoted in Tenopir (2004), an ISI study has found "'no discernible difference in terms of citation impact or frequency with which the journal is cited' between traditional and open access journals" (p. 33). Other databases, such as the National Library of Medicine's MedLine which has traditionally been fee-based, have since become openly accessible allowing people worldwide, doctors and patients alike, access to the newest medical research (McSeán, 2005).

With encouragement to embrace open access coming from those funding much of the research and also from those publishing the research, and with content from such journals included in online databases, it stands to reason that open access has become more than a mere fad or pipe dream. Moreover, open access models are beneficial in a number of ways (Antelman, 2004; Nicholas & Rowlands, 2005):

- Research is available at no cost, and with no access restrictions, for readers around the globe; scholars in economically disadvantaged areas are no longer barred access to the newest research.
- Because research published via avenues of open access is openly accessible online, it is more easily discoverable both by scholars and by search engines.
- For scholars in science and technology, where subject matter may be especially time-

sensitive, publication in open access journals occurs much more rapidly, and not necessarily with any impact on quality control.

- Since research is available globally without access restrictions, scholars benefit from having a significantly larger, more diverse audience.
- Increased exposure to research will also lead to more numerous citations.

These benefits are judged to be more or less uncontroversial, unlike the issue of cost which will be discussed more fully in a later section on the economic impact of open access. Let it suffice to say that open access is an issue worth investigation by academic libraries given the general trend of shrinking library budgets and growing journal prices, especially within the scientific, technical, and medical (STM) disciplines (Rovner, 2005; Crawford, 2005b). In a number of articles on the subject of open access, in fact, the phrase "serials crisis" is bandied about, leading one to believe that there is at least some kernel of truth to the notion.

Impacts of Open Access

Shifting from the traditional model of scholarly communication to open access is a significant move, perhaps even a revolutionary one. There are numerous ways in which open access might impact an academic library, broken into the following categories in this paper: economic, technological, collection development & management, and the very roles that academic libraries play. Each of these impacts will be discussed in turn. There are impacts other than those examined in this paper, such as those concerning reference services, information literacy, and peer evaluation, but research in these areas was light at the time references were

gathered.

Economic

Those who use scholarly materials made available by sources conforming to the principles of open access are not required to pay for access, so publishers must find alternative methods of financially sustaining operations. Publication of materials does not come without costs, although one might be tempted to think that purely electronic resources cost less simply because there is no concern for production and distribution of print materials. However, electronic publications, of which open access materials are a subset, carry their own significant costs such as those associated with computer and network maintenance, sufficient bandwidth, staffing, and editorial review, among others. Scholarly communication thus changes "from a publishing model where readers pay for access to one where authors pay for publication" (Wren, 2005, p. 1128). Open access should not be thought of as being necessarily cheaper than traditional scholarly communication; the costs of publication and access are not eliminated but shifted to other sources.

Some open access journals, such as BioMed Central, operate on a model where a university or college pays a membership fee to subsidize the cost of publication, which is useful especially for institutions with prolific faculties. As Tenopir (2004) points out, however, "a downside is that a membership fee sounds suspiciously like a subscription fee. Some big universities worry that their fees are an unfair burden, forcing them to pay for open access by others" (p. 33). The question then becomes what department at the university will assume these costs.

At some universities and colleges, publication charges *are* shouldered by the libraries which, at schools with researchers that publish frequently, may find such costs to be as expensive as those associated with traditional journal subscriptions (Gass, 2005). A report by the Cornell University Libraries, as referenced by Gass (2005), indicates precisely this though it does not take into account the fact that much research is subsidized by grants and other sources of funding external to the libraries. One such funding agency is the UK's Wellcome Trust, which now requires all of the articles coming out of research it funds to be deposited in an appropriate open access source, whether an electronic journal or repository, within six months of publication (Bloom, 2005). Academic libraries would benefit from surveying university faculty to approximate the extent to which research is funded by grants and other funds, in order to determine the potential financial burden of embracing open access. Finally, though the Cornell report indicates that "the costs of publishing do not go away, they are simply redistributed," the question bears asking whether there is still value, or virtue, to be found in said redistribution.

Technological

Institutions that decide to support open access via implementation of an institutional repository or creation of an electronic journal also face a number of technological issues. One of the most crucial issues is how to handle citation permanence. Antelman (2004) points out "a study performed using the Citebase data found that the more often a paper is downloaded, the more likely it is to be cited" (p. 373). Links to electronic resources are already quite fragile, and it is common to find outdated, broken links even on reputable, well-updated websites. Providers of open access materials thus need to address how they will be referenced, e.g., by using

persistent identifier technologies such as DOI, ARK, or PURL. Technology *per se* is not sufficient to solve the problem of citation permanence, however; an organizational commitment to same is also required, as is active management of electronic assets.

There are numerous methods by which to make electronic materials discoverable, such as submitting URLs to widely-used search engines like Google, and getting included in appropriate directories like the Open Directory Project and the Directory of Open Access Journals (DOAJ). An institution might also benefit from leveraging technologies originally intended for open archives, such as the Open Archives Initiative Protocol for Metadata Harvesting (OAI-PMH), and connecting with other leaders in the relatively new "Web 2.0" initiative. The OAI-PMH works in much the same way that Z39.50 does, enabling a common set of functions to be accessed via a standard protocol. The great benefit of OAI-PMH is the ability to harvest records from numerous providers (e.g., open access journals, institutional repositories, etc.), and aggregate them under a single search. One such implementation has been undertaken by the University of Michigan, named OAIster. As of December 20th, 2005, OAIster had harvested more than six-and-a-quarter-million records from nearly six-hundred institutions.

Should the academic library decide to create its own open access journal or institutional repository, there are yet more considerations to be made. Will it commission a team to build a new technological platform, or will it use pre-existing software? A number of software platforms already exist for electronic journals and repositories: Open Journal Systems, EPrints, and DPubS for the former; and DSpace, Fedora, and aDORe for the latter. Academic libraries whose units and communities will best be served by utilization of pre-existing platforms will benefit from a quicker implementation phase. Others will likely take longer to tailor-make a

system, but may benefit by having a more perfect fit between needs and functionality.

Collection Development / Management

The most challenging issue facing those who develop and manage library collections is how they will keep track of open access sources. Will their users be satisfied with just a few links to begin with, e.g., to the Directory of Open Access Journals, Google Scholar, arXiv, and OAIster? Given the growing number of open access sources already out there, collection builders may struggle to bootstrap themselves by introducing such sources to their collections. As sources begin to distinguish themselves from others and lesser-known, less widely used ones fade into obscurity, the task may become easier. Academic librarians responsible for collections may need to come together with fellows at other institutions, and with scholars within their own institutions, to discover how others are dealing with the glut of open access sources and to determine which are being published in the most widely. They may even decide to forgo inclusion of open access sources into their collections altogether, should their communities be judged not to benefit therefrom, though it is believed that this only saves them time in the short-term; eventually, most academic libraries will need to confront the important issue of adding open access sources to their collections if they wish to serve their communities in the long-run, and indeed, if they wish to stay relevant.

Should the open access revolution continue to grow much longer at the speed it is now, it may yet have greater impacts on academic library collections. As more and more legitimate scholarly journals adopt open access policies and come into being, and as an increasing number of scholars publish their research in open access sources, librarians (not to

mention commercial publishers) may confront a very serious question: should they continue to pay for (or provide) fee-based scholarly journals? Giles (2005) notes that "the fear [of publishers] is that libraries will cancel their subscriptions if papers are made available for free" (p. 543). Furthermore, should academic libraries find themselves in such a situation, and assuming they are not saddled with exorbitant open access publication costs, how will they spend this extra collection money? They may even be able to re-establish their levels of expenditure on monographs and humanities journals (Crawford, 2005a), rounding out their collections in a way unseen since the advent of the STM serials crisis.

The Role of Libraries

Perhaps the greatest impact that the open access movement may have on academic libraries is that of putting them in a position to examine the very roles they play within their institutions and indeed within the global information market. Academic libraries wishing to control their financial destinies, so to speak, may begin to assume new or expanded responsibilities such as serving as one of the institution's most prominent publishers of scholarly material. The role of "library as publisher" is not entirely novel, but may become a key role that libraries play as they become more and more involved with open access, and may very well result in a radical transformation of scholarly communication as it is known today. While it is reasonable to suggest that academic libraries will bear some costs in this emerging role, "the nominal costs of electronic publishing [may also be] absorbed by the institution as part of its commitment to scholarship" (Crawford, 2005b).

Libraries might go about the task of publishing scholarly material in a number of

ways, among which are cultivating and managing their own electronic journals, and supporting an institutional repository. One of the key goals of the institutional repository, simply stated, is to capture the intellectual output of an institution and make it available via a single interface, so that one no longer needs to scour disparate faculty and graduate student websites in order to find their research. A single point of access, search, and organization of scholarly materials within the institution would be of value to the communities served by academic libraries, and there are certainly other values of institutional repositories. One such value is digital preservation, as "libraries are in a better position than individual academics to guarantee that the collection is systematically available even after decades" (Björk, 2004).

The implementation of institutional repositories may be the easiest step; academic librarians "also must be able to persuade faculty, many of whom are for a variety of reasons quite reluctant, to contribute their prime research output" (Antelman, 2004, p. 374). Liaisonship with the institution's faculty is thus seen as another key impact of open access. Though academic librarians already engage in liaisonship, efforts to sell open access, and librarians' ability to do so, will need to be stepped up. And even if the faculty understands and agrees with the vision of academic libraries in terms of institutional repositories and open access journals, that is no guarantee that they will be willing to modify their behavior such that they contribute. Björk (2004) offers an interesting analogy:

"Trying to get researchers to support the move towards open access, which most agree would be good for the advancement of science in principle, is like trying to get people to behave in a more ecological way. While most people recognise the need to save energy and recycle waste it takes much more than just awareness to get them to

change their habits on a large scale. It takes a combination of measures of many different kinds, such as technical waste disposal infrastructure, legislation and taxation to get massive behavioural changes underway" (p. 17).

Libraries may thus need to look elsewhere for assistance with getting the faculty to change their behavior, perhaps to each other, and perhaps to the institution itself. For open access journals, one way to engage faculties and get them actively interested and, more importantly, involved with open access might be to present them with opportunities to serve on peer review editorial boards.

Conclusion

Numerous trends towards open access publication have emerged over the course of the past few years, confronting academic libraries with new challenges and presenting promising opportunities: thousands of open access journals have been created, fulfilling the promise of so-called "gold" open access; institutions have built on work done in the realm of open archives by founding institutional repositories, providing for "green" open access; funding agencies have increasingly been requesting, or requiring, that articles based on the research they fund be deposited in open access sources within a certain amount of time; and some commercial journals have even been releasing material openly after a specified "moratorium," at a cost to the researchers, an option which is increasingly being taken. It is clear that open access has arrived and is more than just a fad or some idealistic dream. The benefits of open access are manifest, as are the many challenges posed by shifting towards broader support for open access. Can

academic libraries continue to afford commercially published journals, especially those within the sciences, technology, and medicine, and still build their humanities, social sciences, and general monographic collections? Academic libraries are positioned to be at the forefront of the open access revolution, but it is altogether possible that they will allow themselves to be left behind. They stand to gain much by investigating potential new roles they might play in the transforming landscape of scholarly communication, but first they must consider the many ways in which they may be affected by open access, weighing significant costs against significant benefits and always with their communities' best interests in mind.

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