The Dramatic Growth of Open Access: Implications and Opportunities for Resource Sharing

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Abstract: The Open Access movement seeks to make scholarly, peer-reviewed journal articles freely available to anyone, anywhere over the World Wide Web. There were some very significant developments in the area of Open Access (OA) in 2004, including statements by major funders in support of Open Access. There are now so many Open Access scholarly journal articles freely available, that, in the author's opinion, being aware of, and using, the resources and related tools is now essential for libraries. Libraries can provide more resources faster for users by supplementing paid resources with ones that are Open Access.

Library resources, such as link resolvers, are beginning to incorporate

Open Access materials and web searches for Open Access materials.

For example, the reSearcher software suite includes Open Access

collections along with subscription-based resources in the CUFTS

journals knowledgebase, and a web search for an Open Access copy of

an article in the GODOT link resolver. SFX also incorporates Open

Access journals. After exhausting more traditional resources,

interlibrary loans staff are beginning to include Google searching in

their workflow.

This article will discuss what Open Access is, the dramatic growth of

Open Access, and major collections, resources and tools. Implications,

issues, and leadership opportunities for resource sharing specialists

will be explored.

Keywords: Open Access, reSearcher, link resolver, knowledge

database, trends in interlibrary loans, leadership, self-archiving

What is Open Access?

Open Access is a process by which scholarly, peer-reviewed journal

articles are made freely available to anyone, anywhere over the World Wide Web. There are two basic means of providing Open Access to scholarly journal articles. The "gold" approach is Open Access publishing. Articles are freely available on the publisher's website, as soon as they are published. In the "green" approach, authors self-archive, or make a copy of their own work freely available. For more information about Open Access, the best place to start is Peter Suber's *Open Access Overview*, [1] or his *Very Brief Introduction to Open Access* [2].

There has been a great deal of debate, written and verbal, on the topic of open access. According to McGrath [3], articles on Open Access account for about one quarter of the articles from 156 library related journals in the near past. McGrath mentions one of the practical implications of Open Access for resource sharing, that is, Open Access as one of the reasons for the decline in document delivery in many countries.

Open Access has been a very controversial topic. A full range of views can be found in the 2004 Special Issue of Serials Review on Open Access [4]. Goodman provides a balanced, thoughtful overview [5]. Gedye [6] and Morris [7] present Open Access from the publishers'

point of view, in a reasonably balanced way. Guédon [8] discusses

options and issues for moving forward towards Open Access in a

particularly profound, and beautifully written article.

This article presents Open Access from the point of view of the avid

Open Access advocate. Success of the Open Access movement is

assumed; the focus is on the practical aspects of making use of Open

Access material. Debate on the relative merits or likely success of the

Open Access movement is left for the many other participants in Open

Access discussions.

The dramatic growth of Open Access

As of early February 2005, the Directory of Open Access Journals

(DOAJ) lists over 1,400 journals. As of February 9, 63 titles had been

added in the past 30 days. The Directory of Open Access Journals

includes only peer-reviewed, scholarly journals that are fully Open

Access. That is, all articles are available immediately with no embargo

or delay period. All journals are carefully selected by a librarian before

being included in the Directory of Open Access Journals. The total

number of journal titles is roughly comparable with some of the

aggregator general journal packages.

For example, the Directory of Open Access Journals title list is slightly longer than the 1,400 peer-reviewed journals in Expanded Academic Index, and slightly shorter than the 1,500 peer-reviewed journals in Academic Search Elite.

This is not meant to suggest that Directory of Open Access Journals can begin to substitute for subscription based resources. A quick glance at Directory of Open Access Journals titles indicates that the average number of articles per journal is likely lower for many Open Access journals than for many subscribed resources. This just makes sense. Many titles are start-ups, rather than established journals. For journals converting to Open Access, the economics of switching to an Open Access business model are easier for smaller journals and/or journals less reliant on subscription income. For example, academic publishing in smaller and developing countries has generally not been a profitable business, and many of these journals have traditionally relied on subsidies.

Some of the titles in the Directory of Open Access Journals are included in the aggregated databases as well. When aggregators add

Open Access Journals, patrons receive high quality content at little to no cost for the vendor, increased exposure and impact for the Open Access journal and its authors, and more value for the dollar for libraries and their users.

Adding Open Access journals to aggregated packages has been a slow process to date. According to Nader M. Qaimari, Program Manager-Infotrac, Thomson Gale includes about 40 Open Access journals in Expanded Academic Index, and plans to add more in 2005 [9]. At the time of writing of this article, 6 more titles had been added in the past week. These journals are carefully selected for quality and fit with the rest of the package, just as subscription-based resources are. A general aggregated journal package is designed to be a balanced collection, unlike the Directory of Open Access Journals which is simply a list of titles that meet specific criteria.

At present, it is not possible to identify with precision the total volume of scholarly articles that are openly accessible. One of the better indicators is the number of items included in an OAIster search. OAIster http://oaister.umdl.umich.edu/o/oaister/ is a search tool for items included in collections that are compliant with the OAI (Open Archives Initiative) protocol. The Open Archives Initiative Protocol for Metadata Harvesting is a framework for automating

harvesting of metadata from different applications. For example, Dublin Core records (brief bibliographic records) from different servers can be automatically gathered so that they can be cross-searched with a single search. A large percentage of the items included in an OAIster search are Open Access journal articles.

Recent months have seen very rapid growth in the number of items included in an OAIster search. There were over 5 million at the time of writing, up from 3.7 million according to the OAIster website on Nov. 15, 2004. This is an increase of over 35% in less than 3 months, an indicator of just how dramatic Open Access growth is at present.

In the near future, Open Access growth will accelerate, for several reasons. First, in the medical area, some of the largest funders in the world have developed policies and positions strongly supporting Open Access. The U.S. National Institute of Health [10] policy requests that researchers place a copy of their article in PubMedCentral for secure archiving as well as Open Access, within 12 months of publication.

The Wellcome Trust *Position Statement in Support of Open Access* [11] supports both Open Access publishing and Open Access provided through Institutional Repositories. An Institutional Repository is an

electronic storage system designed to maintain items of particular value to an institution, such as the journal articles written by a university's faculty members. The Wellcome Trust encourages grant recipients to make copies of their articles openly accessible. Clear directions set by major funders will have profound effects on author behavior and, subsequently, publishing practices.

Acceleration in growth of Open Access at libraries and universities in many areas in the world is anticipated because many institutions are at various stages of developing or filling institutional repositories.

The members of the Canadian Association of Research Libraries are committed to the development of institutional repositories. Of the 27 university library members of the Canadian Association of Research Libraries, about half (14) have functional institutional repositories. Of these, a number are in relatively early development stages. Information and links to the IR projects can be found at http://www.carl-abrc.ca/frames_index.htm. Other Canadian Association of Research Libraries members have institutional repository projects that are still in the planning stages.

Institutional repositories take time to develop, and longer to fill. This

is particularly true when Institutional Repositories are reliant on voluntary self-archiving, that is, when placing an article in the Institutional Repository is entirely at the author's discretion. This is the primary reason why many Open Access advocates are recommending mandated self-archiving. For example, the United Kingdom government's Science and Technology Committee issued a report entitled *Scientific Publications: Free for All?* [12], recommending that results of all research funded by the United Kingdom government be made freely accessible in a network of institutional repositories across the United Kingdom. While the United Kingdom government has rejected the mandated approach, the United Kingdom's Joint Information Systems Committee, tasking with providing a centralised and coordinated direction for further and higher education in the United Kingdom, is already developing of the institutional repository system, to be filled on a voluntary basis.

Even though a mandated approach might speed things up, even with a purely voluntary approach, there will come a point when the substance of the content of these institutional repositories will greatly facilitate promotion of the Institutional Repository services. The early slow growth in filling of Institutional Repositories will suddenly accelerate as authors and institutions begin to "get" why those institutional

repositories just make sense.

Here are two reasons why those institutional repositories just make sense.   At Simon Fraser University Library's Institutional Repository at http://ir.lib.sfu.ca, which the author is familiar with from the perspective of an author and user, many of the articles in the Library Community are from journals to which the library does not subscribe. These are not necessarily expensive journals. They include titles like *Collection Building* and *Letter of the LAA* (Library Association of Alberta).   It is just that no library can afford to subscribe to all the journals.

Once universities realize that the Institutional Repositories facilitate access to the work of their own staff, Institutional Repositories are likely to become very popular with administrators. As an author, I find the institutional repository very handy for maintaining a collection of my own works, at least the ones completed since my arrival at Simon Fraser University. The Institutional Repository also provides an easy way for me to share my work with potential readers, without wondering whether their library has a subscription.

To summarize this section, there are already some very substantial

Open Access resources out there. The growth of Open Access has been very dramatic in recent months, and the author anticipates even more dramatic growth in the near future.

Open Access Resources: Journals, Self-Archived Articles, and Search Tools

Open Access Journals

BioMedCentral http://www.biomedcentral.com/browse/journals/

Articles in over 100 journals are immediately, freely available. Subscriptions may be required for other content, such as reviews or paper reports.

Directory of Open Access Journals http://www.doaj.org/

Over 1,400 free, full text, scholarly and scientific journals. Coverage is intended to include all subjects and languages. Suggested titles are carefully selected by librarian experts before they are included in the Directory.

Highwire Press

The largest Open Access archive of medical and scientific journals.

Most articles are available after an embargo or delay period of 2 to 24

months.   As of January 2005, over 800,000 free full-text articles were

available from the Highwire Press site.

A list of titles and embargo periods is at

http://highwire.stanford.edu/lists/freeart.dtl

To browse or search the Highwire collection, go to

http://highwire.stanford.edu/

Medknow Publications http://www.eln.bc.ca/view.php?id=1127

High-quality, peer-reviewed journals in the medical area.

PubMedCentral http://www.pubmedcentral.nih.gov/

The PubMedCentral collection includes over 160 Open Access journals

in the medical area.

Public Library of Science http://www.plos.org/

While Public Library of Science is a small publisher, this is definitely an

initiative to watch. Public Library of Science competes with the most

prestigious publications in science. Public Library of Science also aims

to make science accessible in more than one sense; each article is

accompanied by a synopsis, written by an expert for a general

audience. So far, two journals are available, Public Library of Science

Biology and Public Library of Science Medicine. In 2005, three new
journals will be launched: Public Library of Science Genetics, Public
Library of Science Computational Biology, and Public Library of Science
Pathogens.

Self-archived articles

When authors make a copy of their own work Open Access, or freely
available to anyone, anywhere over the World Wide Web, this is called
self-archiving. The following sections discuss significant resources
such as subject repositories and institutional repositories, as well as
search tools for locating self-archived articles.

Subject repositories

Subject repositories are collections of articles that are grouped
together by academic subject or discipline.

arXiv http://arxiv.org/

- arXiv is an e-print service in the fields of physics,
  mathematics, non-linear science, computer science, and
  quantitative biology.

rePec http://repec.org/

- over 200,000 freely available items in economics

PubMedCentral http://www.pubmedcentral.nih.gov/

- o The PubMedCentral archive includes access to individual Open Access articles, as well as the journals in the PMC collection.

Cogprints http://cogprints.org/

- o an electronic archive for self-archived papers in psychology, neuroscience, linguistics, and many areas of computer science

Institutional repositories

OAIster list of institutions

http://oaister.umdl.umich.edu/o/oaister/viewcolls.html

405 institutions are listed on the OAIster page.

Institutional repositories, departmental websites, and personal home pages often include not just peer-reviewed literature, but also grey literature such as:

- o PowerPoint
- o datasets
- o reports
- o conference proceedings
- o student papers

Search Tools

Following is a very brief synopsis of a few of the tools available to locate Open Access materials.

The nature of Open Access is such that many articles will be found through a simple web search. Often a title search, or combined author/title search, will work.

Google Scholar http://scholar.google.com/ search is another option. Note that results mix Open Access and subscription based resources. Not all Open Access articles will be retrieved with a Google Scholar search, however. If a Google scholar search does not retrieve results, it is worthwhile to conduct another search using regular Google (or another web search engine).

OAIster http://oaister.umdl.umich.edu/cgi/b/bib/bib-idx?c=oaister;page=simple
Features keyword and basic field-based searching (title, author/creator, subject) of over 5 million items. Many of these are openly accessible, scholarly, peer-reviewed journal articles, but there are other types of materials as well. The basis for determining

whether items are included in an OAIster search is whether or not they are compliant with the Open Archives Initiative (OAI) http://www.openarchives.org/ protocol.

CARL Metadata Harvester http://carl-abrc-oai.lib.sfu.ca:8044/ Search for articles in any of the Canadian Association of Research Libraries institutional repositories.

Highwire Press search http://highwire.stanford.edu/ Search for over 800,000 free full-text articles, as of January 2005.

Directory of Open Access Journals http://www.doaj.org As of February 2005, 349 of the journals listed in the DOAJ were searchable from the DOAJ web site at the article level.

Current library uses of Open Access materials in resource sharing

Libraries are beginning to use both informal and formal means of incorporating Open Access materials in resource sharing services. For the user, this means faster access to needed information, while the library will often save time on interlibrary loan costs and staff

processing time.

At Simon Fraser University Library, Document Delivery Services Division Head Scott Mackenzie reports that whenever an item is likely to be difficult to find, after exhausting traditional resources, staff always try a Google search.

Open Access resources can also be incorporated into library search resources. For example, the reSearcher software suite provides several means of facilitating access to Open Access materials. reSearcher was developed at Simon Fraser University Library for the COPPUL (Council of Prairie and Pacific University Libraries) group. This suite of software is used extensively by BC Electronic Library Network partner libraries as well.

reSearcher includes a link resolving service, (GODOT), journals knowledgebase (CUFTS), and MARC records downloading function (cufts2marc), in addition to other services. An integrated serials management system and MARC records enhancement service (CJDB, for CUFTS Journal Database) will be available in summer of 2005.

GODOT employs two mechanisms to connect users with Open Access

articles. The CUFTS knowledgebase includes journals from major Open Access collections. When a user finds a citation to an article in one of these journals, clicking on the "Where can I get this?" link in a GODOT enabled abstracting & indexing database will take the user either directly to the full text, to the table of contents, or journal homepage. The most direct link to the full text of the article itself is always the one that is presented first. Whether it is possible to link directly to the article or not depends on development at the vendor's end. For example, OpenURL compliance makes link resolving at the article level easy.

GODOT also provides a web title search option, so that the user can look for an Open Access copy of the article in this manner. Whether this is enabled is determined by the library. Libraries can also customize which search engines are shown – some only show Google, while others provide users with Google and Teoma options. Some libraries have elected not to display the web title search option at this time. This search option will often pick up an Open Access copy of an article that has been self-archived by the author. Due to the nature of web searching, search results are not limited to full text of the article. Often, related results such as an author's home page will be returned instead. This lack of precision is one of the reasons why not every

library is making this option available to users at this time.

At the University of British Columbia, SFX is also set up to help users search for Open Access materials. Link reSearcher, SFX makes it possible for libraries to set up access to Open Access titles, on an optional basis. If a title is not in the Knowledge database and there is an ISSN or journal title, a Google scholar search box is populated. If there is an article title, a Google search box is populated.

MARC records for the Open Access journal collections in the CUFTS knowledgebase are available for free download though the cufts2marc utility. These MARC records are developed using metadata supplied by vendors, enhanced through the contribution of records from the CUFTS user community and the automated harvesting of freely available cataloguing records, such as those supplied by the Library of Congress.

Basic details available in all MARC records include title, ISSN, and URL. About 70% of records are enhanced with call numbers and subject headings. Further enhancement of journal records, including addition of URLs to print holdings, is in development as part of the CJDB project. It may be of interest that the MARC records for the

subscription databases allow for indication of interlibrary loan

permissions at the database level prior to download. That is, before

downloading the records for a database, it is possible to indicate "ILL

allowed" in the 540. This message will then be available in the

cataloguing record for every title.

To download free MARC records for Open Access and other collections,

go to http://lib-cufts.lib.sfu.ca/CUFTS/list-resources.cgi.

Descriptions and links to further information about the Open Access

collections available through reSearcher is posted on the ELN web site

at http://www.eln.bc.ca/view.php?id=1129/

For more information about the reSearcher suite, go to

http://theresearcher.ca/product_about.html

Implications and issues

There are many possible implications and issues surrounding Open

Access for resource sharing.

Library users everywhere will benefit from more immediate access to

many more resources than their libraries can afford. For the users of any library that cannot afford unlimited, subsidized interlibrary loans, the benefits will be that much greater.

Multiple versions are an emerging issue. Like many issues, it is easy to mix up or conflate the multiple versions issue with Open Access. It is one of the characteristics of the electronic medium, that it is easy to create multiple versions of documents. Any standard business document nowadays can go through a number of editions. Keeping track and ensuring that the most current edition is the one that is used can be challenging.

When citing a document on the web, it is important to note the date the web page was viewed, as these documents can and do change frequently, or disappear altogether. For that matter, if it is important to maintain a record of information found on a web site, it is a very good idea to print out the web page. The electronic medium makes it easy to plagiarize, or to republish information either exactly as is or with very minimal variations.

A scholarly journal article may be made openly accessible as a preprint, or in various stages of processing up to and including the

publisher's final version. That's not the end of the story, either, as post-publication reviews, updates, and citation links are a real possibility as well.

The issues are not quite as simple as pre versus post print.   A preprint could be a rough draft, or a highly polished version which differs very little from the final published version. Any individual article may change little or a great deal through the refereeing and editing process. The differences can be substantive or stylistic in nature. The differences may or may not be important from the point of view of the individual user.   The importance of final versions can be discipline-dependent. Physicists, for example, have been using the arXiv preprints for years, and are very comfortable with reading preprints. Apparently in physics, preprints are normally expected to be very close to the completed version. Whether this will prove to be the case in other disciplines remains to be seen.

Even for the user who needs the publisher's final version, having access to another version may provide a better indication of whether it makes sense to proceed with an interlibrary loan request, than one would gather from having access to citation or abstract information.

Many more types of information will be readily available than was the case in the past. Institutional repositories are likely to include PowerPoint presentations, audiovisual media, theses, datasets, reports, and peer-reviewed articles. Increased availability of these kinds of materials may increase demand. The demand may arise whether the material is actually openly accessible or not.

It is possible that interlibrary loans activity and workload will decrease, because users will be able to retrieve more information without assistance. However, it is also possible that user expectations will increase. For example, the volume of requests for grey at the moment may be impacted by to low expectations of retrieving this kind of information promptly. Users who become accustomed to being able to find new types of information easily, may well begin seeking help in finding these kinds of items. Not all these items will be easy to locate, even if they are Open Access, and not all will be freely available. This could mean a decrease in routine interlibrary loan requests, combined with an increase in more complex requests requiring more expert knowledge and/or more advanced search skills.

Summary and Conclusion

There are now so many openly accessible materials, that it has become very important for staff in resource sharing to be aware of, and make use of, these materials. Resources include Open Access journals, and articles which have been self-archived by their authors. Search tools range from simple web searching to accessing specialized tools such as OAIster and collection-specific tools. There are many potential issues which may impact on resource sharing, including potential changes in the volume and type of work, the kinds of materials that are readily accessible, and different versions of the same item.

Libraries and librarians have been leaders in the Open Access movement, originally seen as one of the potential solutions to the crisis in serials pricing.   In 1997, the Association of Research Libraries initiated SPARC, the Scholarly Publishing and Research Coalition, an alliance of universities, research libraries, and organizations, designed to be a constructive response to market dysfunctions in the scholarly communications marketplace. For further information, see the SPARC web site at http://www.arl.org/sparc/about/index.html. SPARC creates and develops competitive alternatives to high-priced journals, and advocates for fundamental changes to the system, and has been actively involved in the Open Access movement.

Librarians with a background in resource sharing should be leaders in the Open Access movement. Who understands better the need to improve access to information, than those who work hard to connect users with the information that is not readily available.

There are many leadership opportunities for librarians relating to Open Access. Now is a good time to make our users aware of the many Open Access resources that are already available. For librarians who are working with researchers, why not use this as an opportunity to promote awareness of the importance of self-archiving at the same time? To find out whether a particular journal has given permission for self-archiving, consult the Sherpa Publisher Copyright Policies & Self-Archiving web page at http://www.sherpa.ac.uk/romeo.php. For materials that are hard to retrieve, would it be prudent to send a letter to the author asking if an Open Access copy might be available? For a sample letter, please see the author's "A letter to the author" in the SPARC Open Access Forum [13]. To keep current with the latest in Open Access, subscribe to the SPARC Open Access Newsletter, or join the Forum discussion. For details, see http://www.arl.org/sparc/soa/.

There will be a need, for leaders to identify what an openly accessible

scholarly literature means for resource sharing services and

practitioners - to determine the directions that will best serve users,

and make the best use of staff resources, in this time of transition.

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