Open Access: How Is Scholarly Information Service System Going?

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Abstract. Open access movement has resulted in a change of the entire scholarly communication environment. Scholarly information service system (SISS) had a significant change which is represented in the emergency of various open access publishing mode and diversification of integrated value-added service providers. This paper analyzed this change, and discussed how academic library should react to the change; also some possible impacts on scientific communication were discussed.

1 Introduction

Nowadays, few scientists take part in the publishing processes of scientific literature which is closely associated with scientific research activities and leave it up to the Third Party, thus gradually form the scholarly information service system (SISS) which is independent of scientific research. SISS is an independent intermediate system which implements the scientific communication process between scientific information creators and users. It usually consists of publishers, issuers, indexing and abstracting service providers, online retrieval service providers and libraries especially academic libraries.

It's a routine that scientists publish their latest research achievements in academic journals since academic journals can both confirm the patent rights of discovery and ensure the timeliness of scientific communication. But since 1990's, international commercial academic journal publishing market has been controlled by several big publishers due to the increasingly fierce mergers and acquisitions. The price raising of academic journals due to the monopoly of academic journals publishing markets leads to a struggling library budgets during 1990s as we told it in terms of "serials

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crisis" which means "scholarly communication crisis." According to ARL's latest data statistics, compared with the year 1986, serial expenditures in ARL libraries in 2005 had increased by 302%, serial unit cost had increased by 167%, but the serials purchased only increased by 42%[1]. To solve serials crisis goals, academia initiated the open access movement.

The Budapest Open Access Initiative (BOAI) defined open access as: "By 'open access' to this literature, it means its free availability on the public internet, permitting any users to read, download, copy, distribute, print, search, or link to the full texts of these articles, crawl them for indexing, pass them as data to software, or use them for any other lawful purpose, without financial, legal, or technical barriers other than those inseparable from gaining access to the internet itself. The only constraint on reproduction and distribution, and the only role for copyright in this domain, should be to give authors control over the integrity of their work and the right to be properly acknowledged and cited."[2] For academia, Open access is both an already existing informal scientific communication mode (i.e. e-print archive) and a completely new scholarly publishing mode as we call it open access publishing. Further more, we believe that open access represents a circumstance under which the SISS will change a lot or be totally reformed.

2 The architecture of open access SISS

Under the open access circumstance, the SISS has changed a lot which is mostly expressed in the establishment of open access SISS while the traditional SISS still is working and may not varnish in a very long period. The traditional SISS and the open access will be worked together to ensure the effective running of scientific communication. The architecture of open access SISS was shown in figure 1.

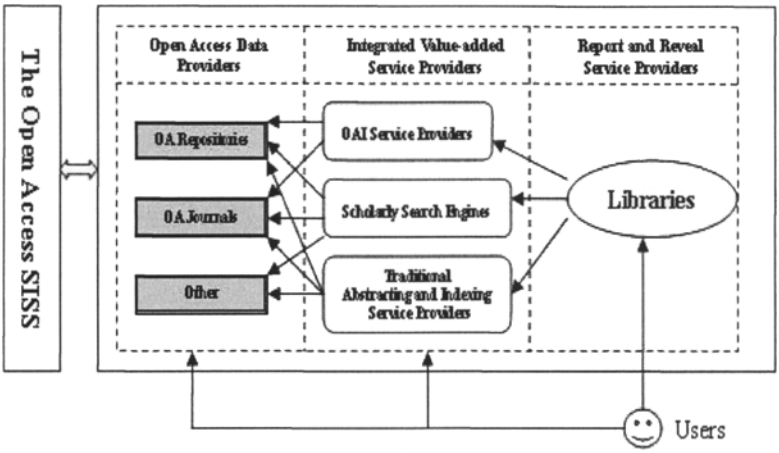

Fig. 1. The architecture of open access SISS

The procedure of the open access SISS is:

- Open access data providers provide resources entity and its related metadata to public through particular ways (i.e. OAI-PMH);
- Data retrieval service providers harvest resources metadata provided by open access data providers and provide integrated data retrieval while also create the linkage to resources entity;
- Data indexing service providers analyze the citing issues and importance of resources through certain mechanism;
- Libraries report and reveal open access resources through resource navigation system, and provide user education, knowledge services etc.

3 The changing points of open access SISS

Compared with traditional SISS, open access SISS has lots of changing points which especially existed in the two aspects below.

3.1 Emergency of various open access data provides

In traditional SISS, scholarly journals mostly adopted peer review system as the only resources while other forms of resources which are also very important to scientific research like preprint were excluded. This problem can be solved in open access SISS properly but may be not so perfect. There are lots of open access data providers

in open access SISS, but generally speaking, the two kinds below are the most important.

3.1.1 Open Access (OA) Repository

Sometimes OA repository can be told in terms of e-print archive. BOAI defined e-print archive as "a collection of digital documents."[3] OA repository can be regarded as a collection of digital resources. OA repository depends on self-archiving, that is to say, authors can submit their digital works into the OA repositories. OA repository can be organized by discipline (e.g. arXiv for physics) or institution (e.g. Escholarship Repository for the University of California). It may content research paper (preprint, postprint), technical report, theses and dissertations, course materials, learning objects, data files, audio and video files, institutional records, or any other kind of digital file.

Early OA repository (mostly disciplinary) was introduced as an informal scientific communication mode, not for open access purpose. It's a definite innovation to incorporate OA repository into open access SISS since it can not only improve the pace of communication, but also facilitate the open access movement.

With the fast growing of open access, OA repositories has adopted a uniform protocol called open access initiative protocol for metadata harvesting (OAI-PMH) to accelerate the distribution and access of scholarly resources.

3.1.2 OA Journals

Though OA repository is regarded as a very effective way to achieve open access, there are lots of critiques about it especially in some subjects which are sensitive to experiment data like biology and chemistry. Open access journal, as a substitute for subscription-based journal, has both open access feature and peer review process and, is becoming popular in scholarly publishing arena.

OA journal can be divided into three types according to Sally Morris [4]:

· Partial open access journals

Some publishers routinely make parts of the articles freely available on web as an effective way to attract more readers to their journals. Still this can be seen as a measure of helping non-OA journals to migrate to fully open access journals.

· Delayed open access journals

Some publishers make their previous issues free available on web after a certain period. This mode was adopted by some not-for-profit publishers. For example, Oxford University Press (OUP) had announced a partnership with Oxford University Library Services (OULS) in support of the national SHERPA project in November 2003, allowing worldwide users to freely access the many of the academic articles published by OUP since 2002 [5].

· Fully open access journals

Fully open access journals mean that journals will be freely available on web to everyone once published. According to Directory of Open Access Journals (DOAJ), there are currently 2656 fully open access journals in the directory [6] while this amount is certainly smaller than the accurate one.

3.1.3 Other

Besides OA repositories and journals, there are other types which can also provide open access. For example, personal website especially some world famous scholars' websites, usually contain a lot of valuable resources. Another example is institutional website like ARL's website we cited before.

3.2 Diversification of integrated value-added service providers

Integrated value-added service providers are the essential part of SISS. Without which, scientific communication can not run normally. Since open access is a new environment, it urgently needs the integrated value-added service providers which match it. There are three typical types of integrated value-added service providers in open access SISS.

3.2.1 Providers based on OAI

Providers based on OAI can also be called OAI service providers. An OAI service provider can harvest metadata from many compliant and provide an integrated interface for users to having "one-step" searching. For example, Directory of Open Access, an open access journals directory edited by Sweden Lund university library, besides providing journals browsing, also provides integrated journal articles searching. Another example is Citebase which is a semi-autonomous citation index for the free, online research literature. It can harvest the metadata from OAI-PMH compliant archives, parse and link their references. Citation analysis can also be carried out.

3.2.2 Scholarly search engine

Search engine is not yet a strange thing to scholars since it had been used by many of them to search academic information especially open access resources. But ordinary search engines have quite a lot of information which has no relationship with scientific research thus can hardly fulfill the demands of scholars. Scholarly search engine has filtered non-academic information, and becomes a very important service provider in open access SISS. Scholarly search engine can search and index open access resources efficiently for the relatively mature technology and the wide collaboration with OAI compliant. There are many typical scholarly search engines like Scirus, Citeseer, etc.

3.2.3 Traditional abstracting and indexing service providers

As we all know, traditional abstracting and indexing service providers provide detailed information about research articles (i.e. title, author(s), abstract, keywords, journal, issue), but generally speaking they do not deal with article full-text. In open access environment, due to the free access to full-text, detailed information about article is much more important than article itself. Thus, traditional abstracting and indexing service providers can take the already existed advantage and participate in open access movement with an active gesture while it's also very important for the development of them.

At the present time, some famous traditional abstracting and indexing service providers such as Medline, CA, SCI have been indexing the open access journals. And in 2005, Thomson Scientific released Web Citation Index (WCI) which can be used to retrieve and access open access resources on web. It attempts to connect preprints, institutional repositories, open access journals and other resources together and becomes a consisting part of Web Of Knowledge platform.

4 How are libraries reacting?

In open access environment, users' dependence on libraries' subscription will gradually decrease. This would lead a relatively decline of position of libraries in open access SISS. Libraries should extend its service contents and improve its service modes to seize the opportunity in open access movement.

Libraries have done a lot of work as information "guider" in recent years. A very exciting practice is subject information gateway. Since open access is still a strange word to most people. Libraries should introduce open access ideas and reveal open access resources in effective ways such as put introduction on website of libraries, open lectures on open access etc. According to a investigation about the websites of libraries of Chinese "211" universities conducted by the author, nearly 60% have practices in this form.

Libraries had aware of the importance of to be a part of open access data providers. At the present time, lots of libraries have taken part in the construction of open access repositories mostly institutional repositories. In China mainland, Xiamen university library has established scholarly repository using DSpace software. But large scale practices have not began.

5 Challenge to scientific communication of open access SISS

The establishment of open access SISS give a chance to break out "journals crisis", scientific communication can be improved greatly. In a word, open access SISS combines the advantages of formal communication and its informal counterpart.

But like one coin which has both of two sides, scientific communication also confronts with challenges in open access environment. One of most important challenges is that the base of communication would change.

In traditional environment, the core of scientific communication system is the "peer review system", that is to ensure the quality of academic articles by gate-

keeper. The base of scientific communication is peer review, in other words, authority of articles. In open access environment, the base of scientific communication has been derived into whether the resource can be accessed. If one article can be accessed (or indexed), even in a short period, it can be cited. Otherwise, it can't. As we all know, not all the open access resources are high qualified, some of them may be totally wrong. Whether dismissing of peer review process can lead to follow the same errors or not is still a problem which is worth to deep research.

Moreover, the long-term access of some open access resources should be doubted. Both the personal websites and institutional websites are highly unstable while not all the OA repositories provide permanent preservation. The extensive use of these resources may lead to "non-verification" of academic research.

References

1. ARL Statistics 2004-05, http://www.arl.org/stats/annualsurveys/arlstats/stats0405.shtml.[2007-04-02].

2. Budapest Open Access Initiative: Frequently Asked Questions. http://www.earlham.edu/~peters/fos/boaifaq.htm. [2007-04-02].

3. Self-Archiving FAQ, http://www.eprints.org/openaccess/self-faq/. [2007-04-02].

4. M. Sally, "Open Access: How Are Publishers Reacting?", *Serial Review*, 30(4), 304-307 (2004).

5. PRESS RELEASE: OUP Supports Oxford University Library Services "Open Archives" Initiative ,http://www.sherpa.ac.uk/news/oupoulspr.htm. [2007-04-02].

6. Directory of Open access Journals ,http://www.doaj.org/.[2007-04-02].