

THE LIBRARY AS DIGITORIUM: NEW MODES OF INFORMATION CREATION, DISTRIBUTION AND ACCESS

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Abstract

Libraries have always been creators or publishers of information. Digital technology, combined with library expertise in bibliographic control, distribution and access, has provided new opportunities for libraries to create, or publish, a wider range of material in support of teaching, learning and research. Monash University Library has a tradition as an early adopter of new technologies, and is recognised in Australia as having been at the forefront of the digital revolution. Over the past five years it has introduced a number of projects and strategies designed to push the door open in support of more effective and creative learning and teaching at Monash University, which is Australia's largest university. More recent initiatives are specifically intended to support Monash University's scholarly endeavours, and to work towards the transformation of scholarly communication. This paper provides details of a number of these initiatives, and identifies some useful overseas models, as well as immediate challenges and opportunities for more advances through greater institutional collaboration.

Keywords

Digital libraries. Scholarly information. Digitarium. E-print repositories. Digital repositories. E-publishing. Electronic publishing.

Introduction

Libraries have always been creators or publishers of information. In ancient and medieval times the library, or scriptorium, was the centre of creation. More recently, libraries' creative role has mainly been in the areas of bibliographic access and control, such as catalogues, indexes and bibliographies, although a number have published material from their rare books and manuscripts collections.

Digital technology, combined with library expertise in bibliographic control, distribution and access, has provided new opportunities for libraries to create, or publish, a wider range of material in support of teaching, learning and research. Hence I have coined the word *digitarium*, to reflect a radically changed role for libraries, one where they can participate fully in all forms of creation and distribution of, and provision of access to, information. More commonly, this is referred to as the "library without walls", but that phrase does not hint at the possibilities for change that accompany the digital revolution.

The term digital revolution is widely used and rarely challenged. The benefits of pervasive, globally networked information technology are well known. What is less clear is how that revolution will transform scholarly communication.

Clifford Lynch, Executive Director of the American Association of Research Libraries' Coalition for Networked Information, says that the digital revolution allows universities to "[move] beyond their historic relatively passive role of supporting established publishers ... exploring more transformative new uses of the digital medium" (Lynch, 2003). In the same article, he goes on to say that academic institutions should support their most creative faculty members, those who have been exploring ways in

which works of authorship in the new digital medium can enhance teaching and learning and the communication of scholarship.

Sally A. Rogers, Assistant Director for Information technology at Ohio State University Library, speaking about her institution's Knowledge Bank project, says: "We seem to be standing on the doorstep of revolutionary change; whether we can push the door wide open and step through is a question yet to be answered" (Rogers, 2003).

Monash University, the largest university in Australia, serves approximately 50,000 students and 5,000 staff over six Australian and two overseas campuses. Monash University has an extensive international and distance education commitment, with more than 8,000 of the 50,000 students being external, distributed around the world. Monash University Library has a tradition as an early adopter of new technologies, and is recognised in Australia as having been at the forefront of the digital revolution. Over the past five years it has introduced a number of projects and strategies designed to push the door open in support of more effective and creative learning and teaching at Monash University. More recent initiatives are specifically intended to support Monash University's scholarly endeavours, and to work towards the transformation of scholarly communication. This paper provides details of a number of these initiatives, and identifies some of the immediate challenges.

Digital initiatives

Catalogue

The first of these initiatives, and the platform for many others, is the library's catalogue (using Endeavour's Voyager integrated library management system), which is a significant digital, web-based database, containing records for 2.8 million collection items, 380 networked electronic databases containing over 18,000 electronic journals and 140,000 e-books.

There were 19,989,730 searches of the library catalogue in 2002.

In the context of this paper, it is more important to look at what the library is doing from the base of that digital resource to create something new.

Systems staff have written a program that automatically, on a weekly basis, creates a new resources list, which highlights new books, videos, CDs, CD-ROMs, microforms and tapes. This constantly changing new product is based on the library's catalogue.

Drawing on the catalogue, library staff are in the process of creating a database of databases. This database, which is expected to be available in mid 2003, is designed to store supplementary information, such as service problem alerts, licence limitation advice and Monash-specific information. The database is created manually but then replicates itself across the various campuses and locations. The records contain administrative metadata, which allows automatic sorting by subject area. From the users' perspective, there will be an improved databases page, with much of the usability design based on comments received in a 2001 survey.

E-reserve

Monash University Library has transformed its reserve collections in support of learning and teaching. There are now online reading lists that link to electronic resources in the catalogue and to over 120,000 pages of material – usually journal articles or book chapters – that have been digitised. This digitised material repository is a newly created product that has made the reserve material dramatically more accessible. Given that Monash has students on six Australian and two overseas campuses, and distance education students reside in over 120 countries, this is a key development. The library's aim is to make the material required in courses as available as possible, as quickly as possible.

We are now creating online lists as a framework from which to hang the digital articles, chapters and links. An example of this is <http://lib.monash.edu.au/resourcelists/matheson1/>.

Some of the links go to material that is digitised by the university's Digitisation Centre, which is a unit of the library. One of the goals of the Centre is to improve the university's control of copyright compliance for teaching materials offered digitally. The library does not, however, create everything that the links connect to – many of the links go to digital content held elsewhere in electronic databases or in open information on the Internet.

Some indication of the success of the digitisation of readings and reserve material is the fact that there are approximately 30,000 accesses per week to the library's image server.

Monash Exams Database

In a similar service to the E-reserve, Monash University Library has created 14,000 links to PDF files in the past exams database, with 1,350,000 hits in 2002.

Monash Lectures Online

Another response to digital technology is the Monash Lectures Online service, which provides digitised lecture recordings to students via the internet. Thirty-three theatres across five of the Monash campuses are wired to provide streaming audio. In 2002 almost 130 courses in each of semesters 1 and 2 were digitised, involving more than 5,000 hours of audio recordings. A total of 145,881 extended live audio streams were delivered on the Internet to the end of November 2002.

Virtual Librarian

Library staff have also created a suite of online instructional modules to train people to use the catalogue. These modules are referred to as the Virtual Librarian service, and the peak use in 2002 was 55,000 hits per week in the first semester.

AARLIN

Under the leadership of the former Monash University Librarian, Edward Lim, a number of Australian university libraries are collaborating to use new technologies to transform access to electronic resources. This project, which is called AARLIN (Australian Academic & Research Library Network), involves the development of customised front ends to library catalogues. The intention is to allow simultaneous searching of databases, with the capacity to self select a database profile, and with the potential into the future to keep adding value to individual inquirers in response to their profile.

AARLIN fits in with Monash University Library's "beat Google" strategy, which aims to reinstate the library as the first source of information for both students and academics. One of the best aspects of AARLIN is that it not only allows searching of multiple databases, but it will then link users to full text where this is available. This is one of the key features of Google, and one that is rapidly becoming the basic expectation of undergraduate students.

AARLIN will also allow the library to address issues raised by users in a recent survey of database use, such as the inability to recognise which databases to use.

Supporting scholarly activity

Two recent initiatives that start to look more like traditional publishing, and which draw on the library's expertise in the management of digital information aim to provide a greater degree of support for Monash University's scholarly activity: these are the E-print Repository and the Monash University Electronic Press.

E-print Repository

Monash University Library has recently started to participate in the national and international e-print repository movement. The rationale behind these repositories, which are based on Open Archives Initiative free software, is to reclaim institutional scholarly output and make it widely accessible internationally, thus removing barriers to learning and research.

Peter Suber, from Earlham College, says that we are at present facing two crises, a *serials pricing crisis*, and a *permission crisis*, both of which are damaging open learning and research (Suber, 2003).

Suber says that “prices limit access, and intolerable prices limit access intolerably”, and that the permissions crisis is the result “of raising legal and technological barriers to limit how libraries may use the journals for which they have paid so dearly. ... The permission crisis is a quadruple whammy arising from statutes, contracts, hardware and software”.

Over the past 5-10 years academic libraries have assisted publishers to lock up a major proportion of the world’s scholarly information, so that it is now mainly available to those fortunate to be part of either an academic institution or a research organization affluent enough to be able to pay the very high subscription costs of aggregated electronic datasets. This is one form of collateral damage resulting from the eager embracing of electronic journals. Another is the gradual squeezing out of monographs from library collections.

Academic libraries around the world, with gathering momentum, are now working with their universities’ faculty staff to build an alternative source of scholarly information. Monash University Library, like a number of other Australian academic libraries, now has an infant e-print repository in place, and staff from the Solicitor’s Office and the library are resolving software and rights management issues before a major institutional self-publishing project is launched. When fully operational, the repository will be made up of working papers, published articles and theses.

Monash University Electronic Press

The e-print repository’s Siamese twin is to be an electronic press (referred to subsequently as e-press), approved and funded in 2003 by the university for an establishment phase of two years.

Unlike the e-print repository, the e-press will be quality controlled, and it will concentrate on electronic journals and conference papers, although there will be a capacity to publish monographs and digital objects.

The goals of the e-press are to:

- foster research and instruction by providing a more direct link between writers and readers of scholarly material;
- use innovative information technology to capture, publish, retrieve, read and present scholarly material;
- promote Monash University’s research activities and intellectual capital in ways that enhance the university’s brand;
- provide an electronic publishing business model that facilitates the identification and pursuit of commercial opportunities;
- build technological, economic and programmatic partnerships with others pursuing similar objectives; and
- lead by example and provide a body of expertise within the university.

The e-press is being established in such a way that most of its publications will confer Department of Education, Science and Training research credits. Journal articles will be peer-reviewed and the e-press will be guided by an editorial advisory committee.

The business plan for the e-press is based on it being “sustainable”, but not fully self-funding, within a five-year period. An essential component of the model will be an e-commerce capability, allowing a continuum from free access, to sale of individual articles, to subscriptions to individual journals, to subscriptions to the full output of the press. It is anticipated that business cases will be prepared for each title to be published, identifying costs and sources of funding.

At this stage the ongoing funding model is not known. Some initiatives, like BioMed Central, are funding their publishing through author and institutional fees. Others rely on faculty funding to support each journal or publication, and others, like Stanford University’s HighWire Press, utilise a range of funding sources. The proposed Monash University model can incorporate any or all of these. A print-on-demand function is also envisioned, with costs to be met by the requestor.

The technical model for the e-press is to publish online a range of material that can be widely searched, browsed or accessed. To achieve this, the press will comprise a central website, together with:

- a digital publications repository holding all publications in their core units (that is, journal article, book chapter, conference paper, etc);
- a metadata repository with content, format and rights management descriptors; and
- a series of websites representing each journal or conference in its own right.

The press is to be located in, and managed by, the library, drawing on international experience in e-publishing gained by other libraries, and expertise in the field already existing at Monash, in the library in particular.

Initially, the press will concentrate on creating electronic versions of some of the dozens of journals currently being produced by Monash academics. Several of these already have an electronic form, and some are solely electronic. Over the past year, the library and the university's Information Technology Services Division have assisted a small number of journals to gain an online presence. The e-press will build on these developments.

During the two-year establishment phase of the press the goal is to produce approximately ten journals fully online, as well as a number of conference proceedings.

The establishment tasks for the press include:

- developing a set of standard agreements, including copyright agreements;
- establishing the host server;
- selecting and installing publishing software;
- determining metadata and resource discovery standards;
- resolving the e-commerce model;
- creating website templates for e-journals and conferences;
- publishing the first journals; and
- promoting the press and its products.

Monash University will be the first Australian university to join the growing number of academic institutions that, mainly through their libraries, are trying to reclaim the scholarly output currently published in heavily protected commercial journals. In taking this path Monash University will be joining Australian National University, which is in the process of establishing an e-press with a primary focus on monograph publishing, and RMIT University, which has established a publishing unit concentrating on databases, indexes and other reference material. This form of publishing is what John Iremonger (Steger, 2002) referred to as "just advanced librarianship" when asked to comment on the profitability of electronic publishing. He is probably right for small presses, although one might question the use of the word "just", and we need to see this comment in an environment that also includes the mega-publishers like Reed Elsevier, which had a turnover of £5bn, and profits of £927m in 2002 (Walsh, 2003).

The library's intention is to keep pushing the limits of what new technologies offer: electronic journals can provide more access and more features than their paper cousins can. Electronic publications can:

- provide links to related sources and information, including datasets;
- support associated chat functions;
- facilitate peer responses and reviewing;
- be interactive;
- be less constrained by size or colour limitations;
- embed audio or video files; and
- reduce the time from creation of content to its dissemination.

Monash University, which does not have a traditional press, is attracted to an initiative that offers flexibility and the ongoing capacity to transform itself as new opportunities emerge.

An academic from the University of Arizona, Professor Henry Hagedorn (Hagedorn, n.d.), has recently resigned as a commercial journal editor to start a free online journal for insect biology, which is published by the university library. He says that he resigned because he feels strongly that commercial publishers are taking advantage of academic scholars. Hagedorn refers to this as the “Faustian bargain: your copyright for tenure”.

Hagedorn argues that the expertise needed to achieve low cost, high accessibility research information is available within academic libraries, and he urges academics to join forces with their libraries to achieve this goal. This is what Monash University Library is offering to its community and associates.

Relevant models

In the absence of local models, Monash University Library looked to overseas experience. Sites of interest include:

SPARC, <http://www.arl.org/sparc>

SPARC is an alliance of universities, research libraries, and organisations built as a constructive response to market dysfunctions in the scholarly communication system, which they argue have reduced dissemination of scholarship and crippled libraries. SPARC serves as a catalyst for action, helping to create systems that expand information dissemination and use in a networked digital environment while responding to the needs of scholars and academe.

HighWire Press, <http://highwire.stanford.edu>

Stanford University Libraries' HighWire Press began in early 1995 with the online production of the weekly *Journal of Biological Chemistry* (JBC), the most highly cited (and second largest) peer-reviewed journal in this field. Scientists and societies rapidly saw the potential for new forms and features of scientific communication, and *Science and Proceedings of the National Academy of Sciences* soon joined JBC online. HighWire now produces 349 sites online, with many more planned. HighWire is organizationally a department within Stanford, as is the Stanford University Press. Both are managed by Mike Keller, who is also the Director of Stanford Libraries.

California Digital Library, <http://www.escholarship.cdlib.org/>

Using digital technologies, eScholarship offers a range of University of California-supported infrastructure solutions that meet the needs of the scholarly community and are extensible to other projects and disciplines. Projects include: an eScholarship Repository; the University of California International and Area Studies (UCIAS); University of California eScholarship Editions; Interactive Map-Based Digital Scholarship for the Humanities; and, Dermatology Online Journal.

BioMed Central, <http://www.BioMedCentral.com>

BioMed Central publishes more than 50 online journals covering biology, medicine, and the life sciences. It operates via institutional memberships and author fees.

Figaro, <http://www.figaro-europe.net/>

Figaro is a European academic e-publishing initiative focused on the creation of an effective and affordable communication and publishing environment for scholars.

Project Euclid, <http://projecteuclid.org/>

Project Euclid is a partnership of independent publishers of mathematics and statistics journals based at Cornell University Library.

The future

All over the world universities, and their libraries, information technology and course development divisions, are struggling to manage the digital revolution. Will we open the door wide and step through into a creative future, or will the door keep slamming shut on us, or (and this what the situation currently looks like) will there be so many doors that we cannot choose which ones to go through? The opportunities are manifest, but so are the challenges.

As with electronic publishing, it is instructional to look to the North American experience, where budgets are more generous than our own, and where it is possible to attract significant philanthropic or government grants to develop digital strategies.

The California Digital Library, already mentioned, has four strategies for the future (Greenstein, 2002). These are:

- i. building, sharing and preserving digital collections;
- ii. creating tools and services;
- iii. influencing and supporting innovation in scholarly communication; and
- iv. fostering strategic partnerships for digital library development.

A number of North American universities are exploring management of digital information through cross-divisional collaboration, including faculties, the library, information technology divisions and the equivalent of Monash University's CeLTS (Centre for Learning and Teaching Support). Cornell's University of Virginia Libraries is developing FEDORA (Flexible and Extensible Digital Object and Repository Architecture), which is to underpin interoperable web-based digital object collections, or libraries. FEDORA is also being tested by other universities, including Indiana.

A scan through the current situation of a number of North American universities reveals the following issues and challenges (Greenstein, 2002):

- Universities have to support an overall digital library strategy at the highest level for the most effective outcomes. This is not something that libraries, or IT departments, can undertake on their own.
- Highly decentralised institutions find it more difficult to agree on overall strategies.
- It is expensive to undertake the research and development necessary to explore new territory.
- Universities are at different stages of cultural awareness of the challenges and opportunities presented by the digital revolution. Some universities will explore new territory more willingly than others.
- It is very difficult to manage intellectual rights without strategies and coordination.

The model that is most attractive to me at the moment is Ohio State University's Knowledge Bank concept (Rogers, 2003), which recommends building on existing digital initiatives to create a linked institutional repository to collect, preserve and create value-added services from digital content produced by and for teaching, learning and research. Sally A. Rogers, spokesperson for this project, says: "The advantage of this approach is that it promotes integration of all forms of academic digital content and [recognises] that seemingly independent initiatives are actually related".

This approach leads to the further linking of the library's catalogue and various digital initiatives outlined in this paper with course web sites, electronic course packs and learning objects. The e-press, with its more sophisticated software platform, has the potential to be a key element of this interlinking.

Conclusion

I'll finish this paper by referring back to the *digitorium* concept that I introduced at the beginning. Monash University Library is already an extensive creator, publisher and disseminator of digital products. Our aim is to continue to explore innovative responses to technological opportunities, and, in so doing, to find new forms of expression and new outlets for Monash University scholarly endeavour, as well as new pathways to the world's scholarly output for our staff and students. In doing this, we are also committed to the restoration of scholarly information to the wider community.

In the immediate future the library is keen to work more closely with others in the university towards an overall information management strategy – a Monash University Knowledge Bank, perhaps, made up of an interconnected network of teaching, learning and research digital objects and resources, easily accessible in a variety of formats and for a variety of purposes.

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