

The Digital Library

Current Perspectives and Future Directions

(2005)

The University of Adelaide Library

About this document

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1 Introduction

In his introduction to the University's Strategic Plan, Vice-Chancellor James McWha says, "In the 21st century universities cannot rely on tradition alone. They must continually innovate – not just in their research and teaching, but in creative support to these fundamental activities."¹ The Library strongly believes that fully embracing digital resources is the best way for the Library to support the goals expressed in that statement and in the University's Strategic Plan. And central to this is the Library's belief that, in terms of our core mission of supporting teaching and research at the University of Adelaide, Digital Library initiatives can and do provide that support in ever more efficient and seamless ways, as can be seen from the many achievements and projects discussed in this paper.

A major role of the Library is the collection, preservation and dissemination of information in support of research and teaching at the University of Adelaide. Traditionally, this has been directed at print and other "hard copy" works – books, journals, and other "papers", and microforms, video tape and sound recordings on vinyl and CD. Since the early days of the World Wide Web, this role has extended to electronic or digital formats, where the challenges presented by the "new" media sometimes differ significantly from print and other hard copy formats. Digital documents still need "collection", by selecting items appropriate to the needs of researchers and students, but licensing of resource packages adds complexity to the acquisition process. Digital documents still need preservation – more so when a document can disappear forever at the click of a mouse – but who preserves resources that are licensed rather than owned by the Library? And, while the WWW can make documents easily accessible through search engines like Google, the authentication requirements for licensed resources makes the problem of dissemination more complex than ever, and requires careful management.

It is no longer sufficient for the Library to provide only a collection and associated services to the other areas. The possibilities of the digital age emphasise the need to integrate Library initiatives with other areas of the University, and for the Library to participate in the scholarly communication process. The Library can play a part in changing scholarly communication by helping academics regain control of the scholarly communication system – a system that should exist chiefly for them, their students, and their colleagues in the worldwide academic community, not primarily for the benefit of publishing businesses and their shareholders. In this it seeks to promote information exchange and discussion, and to further research and creative endeavour.

This paper begins with an overview of present services relevant to the Digital Library, followed by near-future projects, some already in progress, others only potential; we then discuss some of the significant trends, opportunities and barriers facing the Digital Library; and we conclude with some

¹ University Strategic Plan 2004-2008, page 2, <http://www.adelaide.edu.au/policies/?34>

recommendations for integrating the various services into a cohesive whole that will mark the beginnings of a true Digital Library.

2 Present Services

The collection and preservation role of the Library has been emphasised thus far, but Library services to University students, staff and to the wider community underpin its dissemination role. Library services currently delivered in the digital environment are described here.

2.1 The Catalogue

Cataloguing involves the accurate recording of detailed metadata about information sources, in order both that users of the Library be able to locate items relevant to their study, and to record the appropriate lending and access policies for each item.

Since the inception of electronic and online services, the Library has made a point of including all electronic resources in the Catalogue, along side more traditional print-based resources and microform material. Conceptually, we want the Catalogue to list all resources supported by the Library, regardless of the medium used to deliver those resources. The Catalogue has always been the single-entry-point finding aid for resources provided by the Library, and this has not changed with the introduction of digital resources.

Initially, this policy was directed at any item, book, report, journal, database or web site 'selected' by research librarians. We have extended this approach to include the learning objects required by lecturers for addition to their courses in MyUni. Links were either provided to commercial suppliers of the digital object, or a print version was scanned by the newly formed DRMC (see below). The Library also digitised all of the photocopies that had previously been requested by lecturers for the Reserve Collection, and provide access to scanned copies of past exam papers. We now follow a policy of digitising out of print undergraduate texts instead of providing photocopies.

2.2 Electronic Journals

The Library currently subscribes to over 18,000 electronic journals and other serials, delivered online through the WWW, and accounting for well over 60% of the Library serials budget. Over one million articles were downloaded by University of Adelaide staff and students from these e-journals in 2004.

The Library manages funds set aside by the University for the purchase of teaching and research publications – over \$4 million per year, including \$2.5 million on online-only or online-with-print publications and is therefore the body in the best position to negotiate with vendors for suitable access. In its dealings with the vendors, the Library is also in a position to identify the types of license arrangements and software and hardware requirements necessary to support access in the best way possible for its users.

Much of this acquisition is done on a cooperative basis, nationally (DEST's Systemic Infrastructure Initiative, AVCC, CAUL), regionally and by sector (e.g. Go8). These consortia allow greater bargaining power with vendors, which is essential in the relatively small Australian market. This introduces a major theme of the Library as it approaches digital resources – cooperation and collaboration, without which much of this activity cannot not happen.

This rather blandly summarises what has been a wholesale and revolutionary change in the scale of access, and method of distribution of the journal literature. This key component of the Library's collection has been profoundly and permanently changed with the advent of the web. While the economics of scholarly publication have eroded the capacity of libraries to pay for journals in print, to the point where we have 50% fewer subscriptions in 2002 than in 1985, the economics of the web have allowed publishers to offer 'package' deals to maintain subscription spending. These package deals have more than made up for the erosion in the Library's print base, to the point where access to the online versions of journals has probably never been healthier. The Library now offers the University community online access to over 70% of the journals indexed by ISI – i.e. the most important journals in all areas of academic enquiry.

In historical terms, access to the important scholarly literature may never have been (with some important qualifications) easier or more complete than at this point in time.

Populating and maintaining the Catalogue with accurate and comprehensive records for thousands of e-journals is therefore a key requirement, and one of a range of new and pressing management issues that large-scale acquisition of online resources has created. One response to the management of e-resources, and specifically e-journals, is the use of a commercial service – Serials Solutions – for the bulk of the catalogue records to describe and link to these resources. Serials Solutions provides a monthly report of changes to our subscriptions, allowing us to ensure that the metadata, and in particular the URL, remains current. Even with this help, maintaining accurate metadata for e-Resources remains a significant burden.

2.3 Electronic Books

We currently have almost 9,000 electronic books listed in the Library Catalogue, including more than 800 eBooks created by our own Electronic Texts project, eBooks@Adelaide.

eBooks@Adelaide began life as a proof-of-concept project back in 1997, but has since grown to a current total of more than 730 titles, mostly works of literature in the public domain. The collection has proven popular, with a current average of around 26,400 requests per day.

In 2004, we acquired a package of electronic books from netLibrary, and expect to acquire more commercial ebooks in the future. Academic text and reference books in particular are excellent candidates for electronic delivery, given both their high demand and ephemeral nature.

2.4 The Digital Resources Management Centre (DRMC)

The DRMC was established in 2002 in response to concerns over copyright of “learning objects” used in course materials, principally prompted by the introduction of MyUni and the conclusion of a new national copyright arrangement with CAL, under which the University has to provide data for periodical audit, and ensure a single copy only is available within the institution, in order to meet its copyright obligations and be allowed to use copyright material electronically. The ability to fulfil these obligations is not currently available within the MyUni software.

The learning objects currently managed by the Centre are largely journal articles and chapters of books, but may be extended to include other objects. The Centre manages the copyright-compliance requirements, and optionally provides digitisation of required materials. One aspect of the Centre’s management includes the creation of a Catalogue record for each learning object: this record can be used for copyright-compliance reporting, but also, crucially, provides a linking point from MyUni course pages to the actual stored object, using a persistent URL to the Catalogue record.

Since 2003 the DRMC has created and catalogued more than 5000 items in support of University courses, for 198 lecturers. The DRMC server of scanned documents receives up to 13,000 requests per week.

2.5 Digital Theses

The Library has been a participant in the Australian Digital Thesis project since 2000, and currently has around 90 research theses available electronically and searchable from the national ADT site. The Library is currently working with the Adelaide Graduate Centre to have the university's institutional procedures amended to better cater for electronic deposit of theses, and to increase the coverage. Theses from the print collection for which there is a demand can be scanned, copyright permitting, and added to the database. In addition the Library has scanned title pages, contents and abstracts wherever available for around 12,000 theses currently in the print collection. The Library has added links from these scans to our catalogue records, which have been added to the National Bibliographic Database, and from there picked up by the ADT. This is an Australian “first”, and this improved access to the content of these unique documents is already showing up in a significant increase in queries and requests to use our theses which were previously only moderately used.

2.6 Other Digitised collections

Digitisation of paper collections is an important aspect of the Digital Library concept, particularly for archival collections, notably at Adelaide in our Special Collections area, where access to the original documents is limited. For such documents, digitisation is the only means of exposing the content of the document to a wider audience.

Some work has already been undertaken in this area, for example the collected papers of R. A. Fisher, and three publications relating to Sir Ronald Fisher, edited by Professor J.H. Bennett, as well as a collection of Federation pamphlets. The size of Special Collections means that the scope for further digitisation projects is enormous, and will require many years of effort.

Digitisation projects are about *preservation* and *access*. Firstly, by making a digital copy of old and fragile materials, the handling of the original document is reduced. Second, having made a digital copy, the document may be accessed simultaneously by many more users in diverse locations, subject only to whatever access controls are appropriate for the document, while the original may be accessed only from within the Special Collections area.

2.7 Web Server

The Library was an early adopter of web technology for delivery of services and information, and today the web site is still a vital gateway to our collections and services. In addition to the basic information about our location, hours of opening, borrowing and physical collections, it provides access to many electronic services and information sources. Librarians with subject expertise provide sites tailored to the learning, teaching and research needs of University students and staff, and many users ask questions of or provide feedback to the Library using its web forms. We use the web site extensively to provide information at times and in places that we can't have staff available in person.

2.8 Document Delivery

Users request documents from remote locations within our own collections, and from collections owned by other libraries or commercial services using the web. Articles obtained can be retrieved directly by the users from their Internet-connected PCs. An automated email supplies the user with a URL and PIN to access a web page displaying their (PDF) documents.

There are several University-wide services in which the Library plays a part, or which interact with Library services, including:

2.9 MyUni

The University provides an online learning and teaching environment, "MyUni", using the Blackboard software package. Academic staff link to Library-provided digital texts from MyUni. DRMC staff provide them with either an authorised link to the commercial source where a web resource already exists, or a link to the catalogue record with URL for printed items digitised by the Centre. The Library also provides instructions for those academic staff who wish to construct their own stable links to Library resources from MyUni. When students log on to MyUni, they currently have a link to the Library's home page. The Library also uses MyUni to deliver training packages designed to assist students in navigating online resources.

The Library has been working with the MyUni team since 2003 to identify software to support the sharing and management digital objects, including the production of quality metadata for both resource discovery and copyright compliance and reporting within MyUni. The need for a fast, federated search capability and a structure to harness both the efforts of academics and library staff are just two of the factors that need to be taken into consideration when reviewing third party software that should improve the speed and efficiency of both storing and documenting learning objects. Some products have already been considered, but it is obvious that there is a wide range of products available that are rapidly maturing in terms of sophistication and interoperability with proprietary products such as Blackboard. A thorough review of offerings, starting with Oracle Collaboration Suite, is required to make the best choice to significantly improve content management within and outside of MyUni to support seamless access by relevant students from a variety of approaches, and to ensure copyright compliance.

2.10 Online enrolment and Access Adelaide

The University provides a web-based online enrolment system, and also a web-based system, Access Adelaide, that lets students view and amend their University records on-line. The information from these sources is used to populate the database of users in the Library system so that loans and other transactions can be recorded, and so that electronic access from outside the campus can be provided to those who are entitled.

2.11 Authentication (LDAP)

The University maintains an LDAP database used to authenticate access to University systems. This works for University staff and students, but the Library also needs to provide authenticated access to its systems for non-University users to whom the Library also provides services. In 2004, the Library was able to implement a hybrid authentication system, using LDAP for staff and students, and the Library barcode for others.

3 Future Services

3.1 Library Portal: ENCompass

Library Portal software is intended to simplify and extend access for library users to the scholarly web, particularly licensed databases and e-journals. This technology allows for simpler resource discovery, federated database searching and more comprehensive retrieval of licensed full text content using the OpenURL protocol.

In 2003-2004, the Library participated in a trial of portal technology, as part of AARLIN (Australian Academic Research Library Information Network), a consortium of 21 Australian Universities. This experience assisted in our evaluation of portal systems, and led to a joint negotiation with the other South Australian universities for purchase of the ENCompass software from Endeavor. We expect ENCompass to be launched in second semester 2005.

The relationship between the University and Library portals need to be explored. For example, there is a library portal 'plug-in' for Blackboard which would allow academics to search the library portal from within Blackboard during course creation. The division of labour within the Library is of interest too, as tasks involved also cut across traditional staff divisions and require the application of traditional skills to new types of activity.

3.2 OpenURL

One of the areas of digital library services most frustrating to users is the relatively underdeveloped linking technology in journal abstract and index (A+I) databases – such as PubMed, Biological Abstracts and CAB – from the abstracted article to publisher web sites for delivery of the full text of referenced articles. Such linking, intrinsic to the operation of the public Web, is fraught with the issues of incompatibilities of proprietary software, authentication and licensing barriers, and the need for business relationships between individual database and journal publishers. As such, it is necessarily incomplete and inconsistent in coverage with much available, licensed, full text content unlinkable to and therefore underused.

Because of this situation, some visionaries in the university library sector developed a protocol – the OpenURL – which would, with compliant A+I databases, allow a resolver database to harvest enough metadata from a journal reference to transform the reference into a request for article delivery from the appropriately licensed copy of the article. This technology at once greatly simplifies the Library's task in building links, simplifies the user experience by presenting a consistent and clear range of choices for full text delivery and, most importantly, greatly extends the range of journals for which full text links can be presented to the user, in each and every OpenURL compliant database.

As such, an OpenURL resolver is key enabling technology for this and every other academic library. The Library subscribed to an "off the shelf" product, LinkSolver, in 2004, and we are currently replacing this with LinkFinderPlus, available as part of the library portal software being introduced this year.

3.3 Electronic Publications.

While we make many thousands of licensed e-resources available, much of our internal management of these resources is hampered by lack of adequate database tools. For example, routine online recording of essential license terms and conditions for the information of staff and users is not currently possible. Recording of technical support, license, sales contacts, site admin URLs, usernames/passwords etc. is presently done as stored e-mail or on the basis of personal memory. Library Systems vendors are starting to produce e-resource management modules to handle these tasks. We need to monitor, trial and budget for such a system in the near future.

While we make use of Serials Solutions to keep our e-journal titles lists up-to-date, there are competitor products with, arguably, more efficient processes to populate the catalogue, the portal and the OpenURL server with the same details. Again, we need to monitor, trial and budget for any products which will provide us with a superior service to the one we now get from SS.

While the world has embraced the e-Journal concept with enthusiasm, there has been some lag in a similar take-up of electronic books. This is now changing, with ebooks now approaching a state of maturity. The Library has looked at several packages on offer, notably Safari and netLibrary, offering high quality academic text and reference books. We acquired a package from netLibrary in 2004, and will continue to examine the available options.

3.4 Virtual Reference

The Library wants to develop further the delivery of reference and enquiry services in the digital environment. The Library presently makes extensive use of email and web forms, but will explore the use of tracking, allocation and knowledge base software, as well as online "chat" and voice over IP to improve communication with users. It will be monitoring new developments in tools in this area.

Collaboration with partners in other time zones will be explored, as it may enable this type of service to operate over longer hours, possibly even over 24 hours a day, seven days a week. Several services are worth investigating, such as QuestionPoint (Library of Congress/OCLC) with the use of OCLC's "24/7 Reference" software.

The University's strategic plan includes development of a “one stop shop” for student inquiries, supported by a 24 hour call centre for phone and email enquiries.² The Library, as a large central facility answering a wide range of enquiries, is interested in exploring how our virtual reference initiatives could be integrated into such a concept.

3.5 Document Delivery

The Library has begun the implementation of document delivery software to automate what has to date been a largely manual system. This automation will make the service more efficient, and give users more flexibility. Links are provided within Library databases so that users can request documents to which the Library cannot provide direct access.

The Library has recently conducted trials of an unmediated document delivery service, in which users could request documents and have them delivered via the Library system but without intervention by Library staff, and also of a request and delivery service for books from the University of South Australia Library. Both will be investigated further when improvements to the available technologies make implementation more practical.

Using the new national library portal, Libraries Australia, users may also be able to place their own inter-library loan requests for items from other Australian libraries.

3.6 EPress and eBooks

The present in-house eText project, eBooks@Adelaide, has obvious potential synergies with the existing Barr Smith Press and the Image and Copy Centre, which could be leveraged into an ePress publishing new works online, and/or a print-on-demand service.

These options remain at a very early stage of discussion but need and deserve further exploration.

3.7 Institutional Repository

An emerging concept that is gaining momentum around the world is that of the Institutional Repository – in its idealised form a managed database of all of the intellectual and scholarly output of the University, from working papers, pre-print articles, theses and whole books, to learning objects and research data sets. Currently, such digital objects exist, but are spread across the University network on a plethora of local

² Page 15.

area servers and personal desktop computers; they may exist in a wide variety of formats; and they are more often than not inaccessible to all but a handful of potential users. The Institutional Repository seeks to bring some management and control to this situation, by identifying suitable documents for inclusion in the Institutional Repository, by ensuring the existence of suitable metadata to usefully identify each document, and by appropriately exposing the documents to Web search engines such as Google (with any necessary restrictions and authentication) so that the documents are available to a wider audience. Inclusion in the Institutional Repository will also guarantee long-term preservation of the content, at least at the bit level.

The Library has traditionally collected the research output of members of the University, in print form, for inclusion in the University Research Collection. We consider the establishment and maintenance of an Institutional Repository to be a natural and obvious extension of that role.

In addition to this preservation of intellectual output, the Institutional Repository will also play an important role in promoting the University to the rest of the world, by exposing our work to a wider community.

There are several projects underway developing software systems for building an Institutional Repository. For example, DSpace, developed by MIT in partnership with Hewlett Packard, and already in use at MIT, Cambridge University and a number of other large institutions; and the Australian ARROW project, building on the open source FEDORA system. The Library is currently pursuing possibilities using the Oracle Collaboration Suite software. Using data provided by Research Branch, we have also built a test-bed database to identify, quantify and experiment with the Institutional Repository concept.

The development of an Institutional Repository at this University is in line with several threads of the University's strategic plan. It would contribute to the relationship between research intensity and innovative high quality teaching; foster dispassionate, rigorous and honest intellectual inquiry; provide service to the local national and international communities; encourage creativity and breadth of vision and reinforce the impact of the University in the community by publicising achievements in research and the successes of students, staff and alumni.

3.8 Online selecting.

Several of our book vendors are now offering online selection of material from their databases. In addition they allow for a user-defined profile to be created and for users to get email links to the latest in their chosen area. Such products are now also allowing automatic review of selections and almost seamless addition and updating of acquisition type information to the Library catalogue. Such offerings are currently being

explored with a view to saving time and effort of both academics and library staff in acquiring traditional print and other material.

4 Barriers and Opportunities

As we've seen from the previous sections, there are many and diverse projects underway or planned which sit under the umbrella term "Digital Library". Indeed, across the University there are, reputedly, over 500 "web sites" storing perhaps over a trillion bytes of "data", in a largely unstructured manner.

What the Library seeks to do, in building a true Digital Library, is to bring some of these projects together in a coherent, managed strategy, to ensure that, where possible and sensible, the different projects are integrated into an overall plan.

Some integration has already been achieved: for example, we have teaching materials – "learning objects" – digitised by the DRMC, identified in the Library Catalogue, and we have courses in MyUni referring to those learning objects by linking to the Catalogue record. We have implemented a simple "Google-like" interface to the Catalogue, on the Library home page, which can be added to any web page, providing rapid access instead of requiring multiple clicking through layers of web pages before being able to search.

There is a great deal more left to achieve, from "details" such as ensuring that all electronic journal sets are comprehensively catalogued, to bringing order to the multiplicity of web sites currently in existence. We expect some projects currently in planning – notably the Library portal – to have a significant impact on integration. Other projects not previously mentioned, which will be of great benefit in this area are discussed here.

4.1 Authentication

Controlling access to digital resources, particularly licensed resources, provides added difficulty for the Library due to a complex client base, which includes not just University of Adelaide staff and students, but "external" clients such as SAMHS and PIRSA, who have contracted the Library to provide services to their users. Typically, these external clients require access to electronic resources from outside of the University network, as do University staff and students who work from home or other locations. Because external clients are not included in the University's LDAP authentication database, the Library requires a more complex authentication method in order to cater for all users.

Additionally, any user (staff, student or external) connected outside of the University network may be subject to firewall constraints which are outside of the University's control.

Another dimension adding to the complexity of authentication is the multiplicity of services each of which requires password access. Even where these systems use the same authentication database, LDAP, the user is still required to log on to each service separately: at every step the user is confronted with requests for username and password, which makes for a less than seamless user experience. Ideally, a user should be able to authenticate

once only, and thereafter have access to all appropriate University systems without further question. The projected University Portal should go some way towards addressing this issue.

These complexities provide a significant barrier to the development of a Digital Library.

4.2 Using the web.

It is obvious that the web is becoming the expected form of delivery for information. A study by OCLC³ showed that 71.1 % all Americans were using the internet, that 75% of these used Google as their search engine, and that 52.8% believed that most information found was reliable. 73% of college students said that they would use the Internet more than the Library. If, then, users are going to use the “public” web as a source of information, there is a clear benefit to be gained from respected institutions, such as Universities, putting up reliable, quality information on the public web.

In a recent experiment, OCLC exposed a sample of its WorldCat database to the web. The Open WorldCat⁴ pilot used limited fields from 2 million records, with 12,000 libraries participating. A Web user who uses a search engine or other site to locate a particular item may be pointed the nearest library that owns the item based on the records in WorldCat, by simply entering their postcode. It even provides a map of the library location, and links to the library’s web site or online catalogue. Libraries Australia is expected to follow suit and expose the holdings of Australian libraries to the web in 2006.

Amazon recently mounted the full text of 250,000 titles to its web site. Its use has been amazing. The heavy use is attributed to its self-sufficiency, satisfaction and seamlessness. Worries about pirating copy seem unfounded, and on the positive side, users were finding older and rare material that they would not have known about, as access to them before the release of this full text to the titles concerned was so limited.

Australian statistics have also become very much easier to access and more heavily used since ABS catalogued and indexed all its web pages, so that they can be found and immediately displayed using normal web browsers such as Google.

Also of interest is the “Eight million books” project launched at Stanford University, which intends to digitise their entire collection of 8 million volumes, beginning with the 2,500 books of the Stanford University Press.⁵

³ OCLC 2003 Environmental Scan, “Social landscape”;
<http://www.oclc.org/membership/escan/social/selfservice.htm>

⁴ <http://www.oclc.org/worldcat/open/default.htm>

⁵ <http://www.honco.net/os/keller.html>

In 2004, Google startled the library world with the introduction of their Google Scholar project, offering their familiar simple search interface, but delivering quality scholarship. This remains a beta project, and has some flaws, but we are watching its development with interest.

4.3 Adelaide on the web.

While projects such as OpenWorldCat are interesting, providing and improving access to the full text of our research and rare documents is what is most likely to enrich the world of knowledge, and place Adelaide on the map with full recognition for the value of its contributions to the advancement of knowledge. Enabling web access to a defined group of full text research documents in a controlled manner would do much to enhance our reputation. Such full text may be digital theses, or other working papers, conference papers, reports, preprints, etc. An Institutional Repository system will support both the archiving and exposure of any full-text, university-owned information to the web, and provide easy workflows to enable this venture to be both practical and efficient.

4.4 Funding

The Library has been in almost continuous budgetary stress for the last 10 years. This has been one of the principal causes and consequences in the remarkable contraction in the print subscription base of the Library's journal collection. The Library has been forced, along with many others worldwide, to make a choice, in terms of journal collection, between print and online because of the impossibility of maintaining the same titles in 2 different formats. One consequence has been that publishers have used web delivery to shore up their revenues by offering multi-year deals to libraries. The Library maintains the same level of spending and in return gets online access to the complete output of the publisher.

Because of this trend, the Library has been able to grow its collection in terms of size and quality at a remarkable rate. The teaching and, in particular, the research support available to the University community has therefore been dramatically enhanced. This has only occurred at Adelaide, however, by reducing subscription to titles from publishers not tied up in these deals and, in 2004/5, by the exceptional change in the value of the AUD against the USD.

For this level of access to continue, the University has to increase Library funding at least in line with journal price inflation and, in years when the exchange rate has worsened, to compensate for that change in circumstance.⁶ Without such a change in budgetary support, the Library will either rapidly fall back to its weakened state of the late 1990's or, in trying to support journal access, divert more and more resources – staff and budget - from print subscription and book purchase to support this activity.

⁶ University Strategic Plan, p.10.

All of the Digital Library initiatives have cost implications in terms of staff and financial resources. In the absence of new money for the Library, the Library will have to make choices about staff deployment, training, recruitment etc, etc.

4.5 Statistics

With the advent of the web, it becomes possible to measure and evaluate the use of library resources in ways that were not really feasible in the print world. This is vital for the Library, and the University, to determine if it is spending too much or too little on e-resources. Publisher-supplied statistics, however, while being accurate in terms of reporting numbers of full text articles downloaded per journal title, give an incomplete understanding of usage, and are laborious to compile. They can tell us nothing about which parts of the University are using which resources and therefore whether the Library is allocating its budget appropriately.

The Library intends working with ITS to try to supplement vendor supplied statistics with statistics derived from the University proxy server, to tell us about the volume of data downloaded from specific sites (for example particular publishers or journals) by category of user (for example Academics, or postgraduates or undergraduates associated with a particular department or faculty). We will therefore get an understanding for not only how cost-effective a particular subscription is, but also for which parts of the University population any particular resource is of most value.

4.6 Human resources

Achieving the appropriate staff resources - numbers, levels, and skills and knowledge profile - is one of the challenges facing the Library (and possibly other parts of the University). Currently we are maintaining both extensive print collections which are still growing, and large and fast-growing digital collections. Our staff numbers have been steadily reduced over the last ten years, as we grapple to move from the print towards the electronic in an increasingly complex networked environment. We need to make the best use of our staff and, when we have the opportunity, to recruit staff with the right skills and knowledge. We must explore further the staff resources we have and provide incentives, opportunities and training for some to acquire more in-depth understanding of our current IT environment and directions. We have begun to restructure work within and between departments of the Library to ensure that adequate staff resources are dedicated to manage digital resources.

4.7 Preservation

Traditionally, the Library has been tasked with preserving all materials acquired in support of teaching and research. For example, we have a "last copy" policy that ensures that we retain at least one copy of any book ever

used in teaching at this University. But this traditional role is severely challenged by the digital environment.

A significant proportion of digital objects are “born digital” and never appear in a “hard copy” format, making the preservation task for digital objects different from that of print resources. Moreover, the Library Catalogue includes many digital items that we do not actually possess in the same sense as we possess print editions of works; we merely reference these items from web sites outside of the Library.

With the move from print to online serial subscription not only do we not host the content we access, we take no direct responsibility for the long-term preservation of this content. Again, this is a radical break with the past. We are relying on publishers or, in their absence, national libraries to do this job.

With the purchase or lease of e-journal back-files, there is an opportunity to free up space on Library shelves, and reduce the need for binding, handling, and processing of print items. But do we relegate volumes and issues to the store, or do we discard after a period of time?

Uncertainty over long-term preservation of web-based material, and uncertainty over the wisdom of assuming that publishers share the librarian’s interest in long-term preservation, presents barriers to radical action in terms of discarding print, and indeed raises questions about archiving some digital material ourselves. This most likely, however, requires national, and in some cases, international resolution, especially in terms of migration of data to new formats.

Certainly, moves to provide a copy of last resort concept that has been discussed between the large cooperative library stores (CARM and URRSA) are supportive in the direction of preservation of a print backup. Pandora and other cooperative projects supported by the National Library (such as Picture Australia) and the UNSW supported Australian Digital Theses project are examples of moves made to preserve some of the digital content. The assurance that the Royal Dutch Library of the Netherlands is providing a digital archive of publications from Elsevier and others is an indication that the largest publishers are taking preservation seriously. Smaller digital publishers are unable to provide such reassurance. Meanwhile, the LOCKSS project (“Lots Of Copies Keeps Stuff Safe”) offers an alternative, distributed approach to preservation that allows an institution to preserve the journals most vital to their needs.

The University should, through the creation of an Institutional Repository, ensure that its own intellectual assets are suitably archived, and the Library feels that it is best placed to manage this successfully. On the assumption that the Institutional Repository movement becomes widespread and entrenched, it also provides an obvious alternative solution to the global preservation of scholarly digital resources.

4.8 Wireless access and mobile computing

The introduction of wireless networking to the Barr Smith Library and other parts of the campus is also impacting our delivery of digital services. Coupled with laptop computers and other mobile devices, the stage is set for a radical shift away from rows of fixed PC workstations, towards a more flexible and dispersed delivery of information: the student will be able to access services and download the information they need, in the location that suits them. This will further challenge Library and IT budgets.

4.9 Library Facilities

In the complex digital information environment, both staff and users of the Library require equipment of a high standard, and maintaining good computer facilities is a continuing challenge for the Library budget.

The Library presents a very public face to the world — in 2004, more than 779,000 visitors came into the Barr Smith Library. It is often the first place visited by prospective students. In addition, prospective students are being offered the use of the Library facilities and guidance in doing so for their year 12 projects as part of the Library's outreach project with both private and public schools within the state. The Library is also heavily used by our international students.

It is therefore essential that the functionality of the Library's equipment and its physical appearance are suitable for the image that the University wishes to purvey to visitors and potential students.

5 Conclusion

From the foregoing discussion, it is clear that the most important concept emerging is that of integration. The many and varied separate services offered by the Digital Library must be integrated, in order to provide a seamless experience for the user. Access to information is better than it has ever been, but is still hampered by multiple interfaces and authentication barriers. Projects such as the Library portal will go a long way towards removing these barriers.

Digital Library services must be integrated, not only with one another, but with other University services. The Information Technology enabling strategy in the University's strategic plan includes "5. ensure integrated planning for the continued development of student systems such as Access Adelaide, MyUni and email"⁷. We suggest that it is necessary to also consider the Library's digital services and initiatives in this integrated planning, and consider it essential that the Library participate.

A second issue is that of preservation. With licensed resources, preservation is no longer under the control of the Library. On the other hand, the huge volume of information produced within our University is currently at risk, and urgently requires a preservation solution. We think the Library is best placed to manage this preservation effort, consistent with our past practices.

A stimulating and challenging environment forms part of the context for the University's 2004-2008 strategic plan. To quote the plan, "In this context, the University of Adelaide has the potential to enhance its current position as the leading provider of higher education in this State ..."⁸ The University of Adelaide Library is the finest research library in South Australia, and one of the finest in the country. We are seeking digital innovations, in collaboration with other areas of the University and with other institutions, to maintain and improve this position, and to enhance the position and reputation of the University of Adelaide within Australia and abroad.

⁷ Page 25.

⁸ Page 9

6 Recommendations

The key recommendations are:

1. That the Library, in order to support these recommendations, review its budgetary requirements, organisational structure, and staffing and training needs.
2. That the Library pursue and promote the implementation of an Institutional Repository, with the technical assistance of ITS and in collaboration with the key research and teaching areas of the University.
3. That the Library and MyUni team jointly obtains funding to evaluate and possibly buy a product to allow the streamlining of learning object creation and management between MyUni and the Library catalogue.
4. That the University review the provision of equipment and the fabric of the facilities within the Library to ensure that it fits with the public image it wishes to convey.
5. That the Library seek to improve the internal management of our licensed e-resources by trialling and budgeting for the acquisition of an e-resource management system.
6. That the University be asked to take specific action to protect the Library budget against inflation and the negative effect of exchange rate fluctuations so that our participation in the major e-journal package agreements is preserved.
7. That the Library promote to the University the integration of the Digital Library services with other University services, and seek to be involved in University planning for integrated services.
8. That the Library seeks funding for expansion of the Digitisation projects in Special Collections.