

Integration: The Glue That Holds the Digital Library Together

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Abstract

As libraries increasingly shift from acquiring and managing print in-house collections to electronic information resources and services from in-house and remote servers, library staff members face the challenge of delivering value-added services to clients who demand access to these services and resources from local and remote locations.

This paper will discuss how the Library of the University of Technology Sydney is meeting this demand and confronting the challenge of providing access to the vast array of information resources to its clients. It will outline the initiatives taken relating to the integration of client needs and the roles and responsibilities of library staff in meeting these needs. Initiatives associated with user authentication, online requesting of resources, links with suppliers, cataloguing of electronic information to maximise access, customisation of online services, etc. are discussed, as are the challenges facing library staff in keeping up with the developments in applicable national and international standards and protocols

The authors will highlight some of the key considerations for the Library staff in the development and provision of services in an increasingly online environment.

Integration: The Glue That Holds the Digital Library Together

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What is a Digital Library?

The literature provides many definitions of the term “digital library”. Some reflect the interests of computing scientists while others reflect the interests of library and information science professionals. The variety of definitions confirm Borgman’s view that “despite its popularity, *digital library remains a problematic term*” (Borgman 2003, p. 86) and she makes the observation about Clifford Lynch’s prescience in noticing that the term obscures the complex relationships between electronic information collections and libraries as institutions.¹

For the purpose of this discussion, the paper will defer to the definition which Borgman regards as the most succinct, provided by the Digital Library Federation and arising from the community of library practice:

“Digital Libraries are organizations that provide the resources, including the specialized staff, to select, structure, offer intellectual access to, interpret, distribute, preserve the integrity of, and ensure the persistence over time of collections of digital works so that they are readily and economically available for use by a defined community or set of communities” (Borgman p. 87).² This definition implies not just a collection of digital resources but also services.

Developments in information and communication technology and the pervasiveness of the Internet and the World wide web have resulted in substantial shifts in the way information is used and in the way that information services are provided.

As members of the library and information profession, it is incumbent on us to attempt to understand how digital information and developments in information and communication technologies (ICT) change the way our users behave, their impact on the functions traditionally attributed to our professions and to libraries. As we operate within an environment that will, for a long time to come, consist of both tangible and electronic information resources, how do we integrate our functions and services to maximise the value for our clients? How do we ensure that our Library staff can provide and sustain valuable services in an environment that is on the whole unfamiliar, rapidly changing, and largely unpredictable in its impact?

Over the centuries, libraries have always housed information in a variety of media. “The formats of documents and other materials to be found in libraries are many, from printed books, journals and other publications, to manuscripts written on paper, vellum, papyrus, birch bark, wood and many other substrates. There is also a wide range of surrogate formats, including photographs on glass plates, negative film, photographic paper, microfilm, microfiche, as well as an increasing range of audio-visual materials. Librarians are used to dealing with a hybrid world of documentary formats, and to providing the technologies through which these can be accessed” (Gorman 2002, p. 5).

If it is likely that the term “digital library” might obscure the complex relationships between electronic information collections and libraries as institutions, is it wise to stay with the term? What messages are we giving to our clients and the community at large about the services that we, in the information profession, offer by using the term? What messages are we putting

¹ Citing from Lynch, C.A. 1993. “Accessibility and integrity of networked information collections, Background paper no. BP-TCT-109. Washington, D.C. Office of Technology Assessment)

² Quoting from Waters, D.J. 1998. “What are digital libraries?” *CLIR (Council on Library and Information Resources) Issues*, no.4, <<http://www.clir.org/pubs/issues/issues04.html>>

across about the continuing role of the traditional library vs. the so-called “digital library”? Do we now call ourselves “digital librarians” “cybrarians” or “virtual librarians”? We doubt anyone of us would go that far.

It is not the purpose of this paper to enter into such a debate. The purpose of this paper is to recognise that many of us do work and, for a long time to come, will continue to work in libraries which offer a hybrid range (digital and non-digital) of information resources and services and we need to focus on how we can effectively integrate what we offer to our diverse clients.

The paper will also outline some of the initiatives being taken at one academic library, the Library of the University of Technology, Sydney in integrating the traditional with the digital in information resources and services.

UTS Library is not a digital library, nor is it a cybrary, nor is it a virtual library. It is a very good university library which provides an increasing range of digital resources and online services while maintaining much needed “traditional” services. This paper will provide an overview of how we have responded to the demands of clients whose environment has a high level of exposure to the impacts of developments in information and communication technologies. We stress, however, that ours is an evolving response, and we do not claim to have found the best solution to integrating products and services in an increasingly online environment.

What we believe characterises the UTS Library and its staff is a willingness to take calculated risks in the context of a dynamic environment. However, we also recognise that we can only adopt what presents to us as perhaps the best solution or the best compromise or the only workable solution at the time. We know that we are operating in unfamiliar territory and it is not always possible to foresee the impacts of what we do. We recognise that, on a few occasions, taking what we regard as the (b)leading edge position with some initiatives, we may not always get it right. The cost of not moving ahead is a riskier, perhaps even irresponsible, position to take. We hope that you will find some of our experiences, some of our successes, failures and the lessons we have learned along this journey worth hearing about.

Why integration?

“The real story of digital libraries is the interplay of people, organizations, and technology.”³

If we accept that the principles of selection, acquisition, access, management and preservation apply in the “traditional” as well as the digital library, our responsibility to our clients is to ensure that the mix of resources and services is effectively integrated to successfully bring together the information and the information seeker/user.

It is worth pointing out here one of what Gorman refers to as Deegan and Tanner’s (Deegan and Tanner 2002, p.22) set of defining principles, i.e. that: “digital objects are made available in a cohesive manner, supported by services necessary to allow users to retrieve and exploit the resources just as they would any other library materials” (Gorman p. 5).

Central to any library are its clients and the key to making a digital library work effectively is anticipating how clients will use both the physical library and its electronic resources. While there are many who make use of the UTS Library’s electronic collections from home, office, the University’s Information Commons areas or international locations, there are large numbers who come to the Library’s three campus sites. There must be sufficient computers, carrels, group study areas, quiet areas for research to cater for those who want to make use of the Library and its staff. The challenge to staff is to make both the physical library and the digital library comprehensible to clients. Since the subject of this paper is the digital library, we will

³ Arms 2000, p. ix

concentrate on UTS's aim of keeping the client as the focus in providing electronic resources via a range of services.

The University Of Technology Sydney: Background Information

The University of Technology, Sydney⁴ provides higher education aimed at enhancing professional practice. It operates on three campuses, the largest of which is located on the edge of the Sydney CBD. International students and those studying at remote locations form an increasing proportion of its large student population, half of whom are studying part-time.

The University Library supports the teaching, learning and research objectives of the University by providing a wide range of information services, an extensive range of information resources and flexible access. It operates across the three campuses and supports clients at other locations, including those studying and working remotely.

UTS has over 29,000 students, most of whom live around the Sydney metropolitan area. About 40% of our students come from non-English speaking backgrounds. Our international students include over 4,000 onshore students and over 700 offshore. Many of them come from China, Indonesia, Hong-Kong, India, Malaysia and Thailand.

UTS Library



Figure 1. The UTS Library, City Campus, Sydney

The Library staff of 110 members supports the UTS community of students, teaching, research and administration staff whose increasingly diverse requirements present interesting challenges for the Library staff. The Library is open eighty-two hours per week, seven days a week for much of the year. In 2003, there were more than 2,032,338 visits to the Library while over 28,600 information requests were answered. Our staff presented information skills classes to over 2,400 clients.

There is a strong commitment to adopting innovative technologies in order to extend access to resources and services beyond the physical confines of the Library buildings. It has long been

⁴ <http://www.uts.edu.au/>

recognised that many of our students and staff access these services 24 hours a day. Our website logs have often shown that there is no hour in the day when no one is logged into our servers.

The Library has about 350 PCs for clients, which provide access to the Library's website and through that, to the information resources and services made available by the Library. A key challenge at UTS Library is how to meet the needs of both our onsite and offsite clients. The further challenge for us is how we can capitalise on our online infrastructure to provide greater access to the information at large in the world. Underpinning these service improvements is the need to ensure sustainability.

IDENTIFYING OUR CLIENTS

“The digital library brings the library to the user.”⁵

The UTS Library directly serves a student population (in headcount as at 2003) of just under 30,000. Reflecting the growth in student numbers over the period, FTE (full time equivalents) of staff increased from 2,183 in 2001 to 2,484 in 2003. It is a diverse user community, representing different socio-cultural backgrounds, different expectations and competencies.

Central to “traditional” and digital libraries are its clients. The challenge posed by such a diverse group of clients is significant. Do we implement one-size-fits-all systems? If not, do we have the resources to implement customisable products and services to meet the demands of our clientele?

Authentication

The University manages an online directory of its staff and students. Each staff member and student is issued with a University email account. The Library makes use of the University directory to identify users who need access to information resources and services and links to already established identification systems in the University rather than create our own patron database. The University's online directory enables the Library to authorise its clients for access to resources and services. It also facilitates compliance with our contractual obligations with database providers. Specialist user registers are created only for those who are not in the University online directory, e.g. registered borrowers within the University Library Australia scheme. Our IT staff use Ezyproxy and Squid to authenticate those clients who are entitled to gain access to licensed databases. We are working on a feature which would enable our user community to login in once only to access our online resources and services. These resources and services currently require several logins. This feature will sit in front of the disparate systems hosting our online services.

INTEGRATING ACCESS TO A DIVERSE RANGE OF INFORMATION RESOURCES

The challenge of acquiring the information resources in support of the institution's clients underpins the Library's collection development policy, whether in the context of a “traditional” library or a digital library. In the case of UTS Library, our information resources, print and electronic, are acquired or developed in support of the University's teaching, learning and research programs.

What is important is that libraries develop a comprehensive collection development plan for both print and electronic resources. This point is emphasised by Lee who said that “the single most important message...is that electronic resources should be considered alongside printed resources (as indeed in some cases, such as e-journals, they must be) and that libraries should

⁵ Arms, p.4

formulate an overall “coherent” collection development policy covering all material” (Lee 2002, p. 7).

In the development of a digital library, Lee comments that librarians need to determine “in particular, how far down the road of digital collection development do you want to travel?...If there is no clear picture of where the digital resource collection is heading, and how it will interface with more traditional collections, experience has shown that resources will start to appear in an idiosyncratic fashion, without any cohesive policy in terms of targeting areas or matching priorities” (Lee p. 65).

The UTS Library is in the process of revising its collection development policy, integrating the variety of media represented in the information resources it needs to organise and to which it arranges access. A few years ago we adopted a policy favouring electronic journals over the print, shifting our collection development focus to electronic journals and databases. This policy was endorsed in the University. In doing so, the University community signalled that it saw the benefits of the online medium and recognised the barriers imposed by printed collections, especially in the provision of support to the University’s increasing offsite community of staff and students.

The Library has a cross-departmental working group called the Electronic Information Resources Group (EIRG) which has the task of considering recommendations for electronic information resources for purchase. It is cross-departmental in composition to address the different aspects which need to be considered in acquiring and providing access to electronic resources. Staff from Information Services, Serials and IT departments are in EIRG. The chair also has responsibility for the overall Library budget which has been useful especially in considering very expensive databases.

In the mid 90s, the Library had subscribed to over 5000 journals in print. By 2003, active print journals numbered around 4,000 while electronic journals had risen to about 34,000. In 2002 the Library’s collection of non-serial titles was 455,052 of which very few were ebooks. By April 2004, our clients could access about 19,500 ebook titles.

The Digital Components of the UTS Library

The front door of the “digital” library is our website⁶:

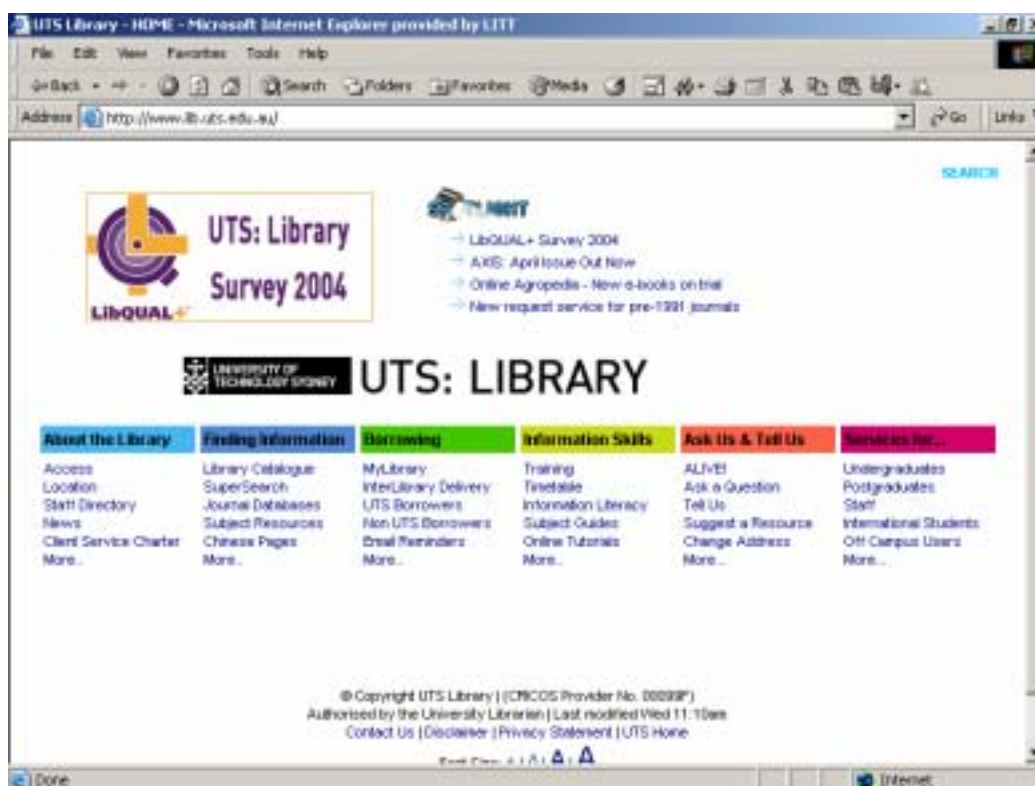


Figure 2: UTS Library's website

Our intention is to provide a clear, uncluttered and easily navigable website which encourages clients to find the information they want as easily as possible and complies with W3C (World Wide Web Consortium) accessibility guidelines. We also encourage comments and questions through online suggestion forms (see *Ask Us & Tell Us*⁷) and, at the time this screen shot was taken, an online survey was being conducted. Feedback assists Library staff to improve services/resources or publicise those already in existence which clients may be unaware of.

The design of the Library website aims to integrate access to the various components of UTS' digital library such as the catalogue, SuperSearch (an electronic information gateway), online databases, e-journals and e-books, electronic reserve, Australian Digital Theses program, and UTSePress (our institutional publisher and repository). Our website is a key component of the glue that holds our digital library together.

The Catalogue (OPAC)

The function of a catalogue is to describe and identify the location of the wide range of resources available to the users of a particular library. Increasingly online catalogues are designed not just to describe a resource but also to provide a direct link to the actual resource, thus enabling the catalogue user to read, view, download the resource, often with full multi-media “display” capabilities.

⁶ <http://www.lib.uts.edu.au/>

⁷ <http://www.lib.uts.edu.au/askus>

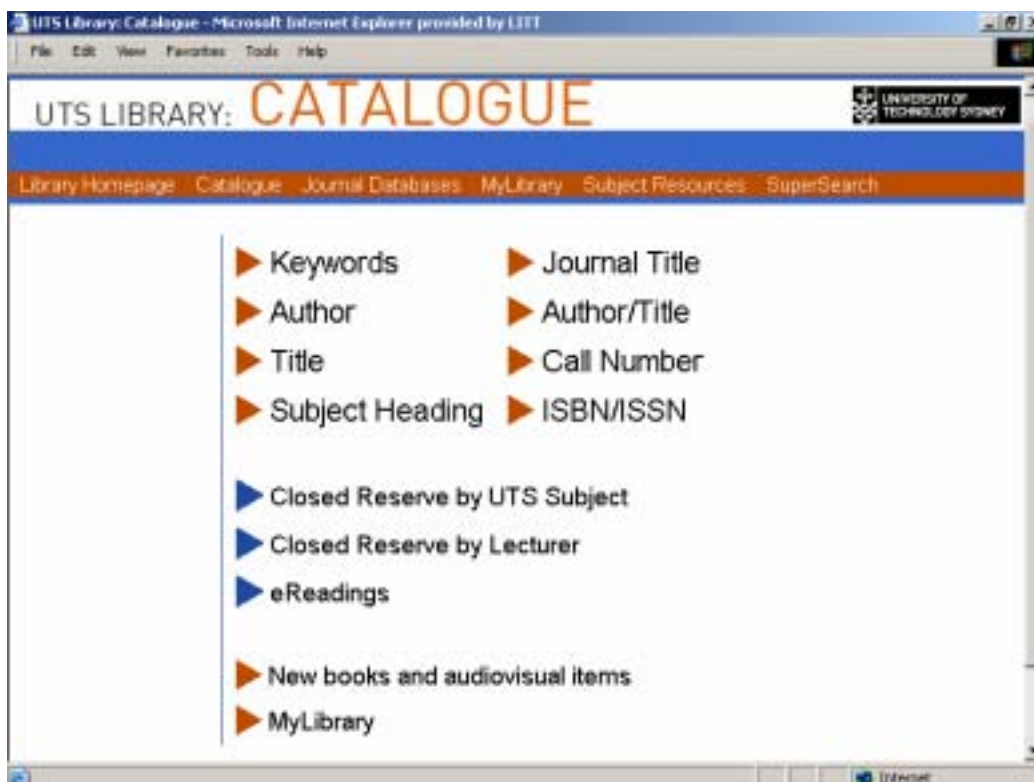


Figure 3: UTS OPAC

The UTS web OPAC⁸ is one of the primary integration tools of the Library. We attempt to provide access to most print and electronic resources through the catalogue, augmenting this access through other devices. Electronic journals and ebooks are all listed in the catalogue as well as being accessible through SuperSearch, a gateway to the Library's collection of electronic resources. In addition, journal databases and ebooks have their own sites on the Library's homepage so that clients who are not using OPAC can be linked directly to their favourite electronic resources. The SFX (reference linking) button in OPAC also allows clients to move from a catalogue entry to a choice of full text options plus other related services.

In 2004 the OPAC was redesigned to incorporate better access to the resource-related pages of the Library's website and to make the catalogue more user-friendly. Consistent navigation links are provided on every page in OPAC to assist clients to move around the website. A new service, called MyLibrary, was introduced allowing authenticated clients to establish subject profiles which send email alerts when materials fitting the profiles are catalogued by Library staff.

To integrate access to electronic full text serials, Library staff use a program called AutoCat (based on software provided by Queensland University of Technology), to massage data received from database suppliers into brief USMarc records for the OPAC. Since UTS has around 34,000⁹ electronic serials it was considered essential that catalogue access to every title be provided. In the case of ebooks, USMarc records or links for insertion in bibliographic records are usually provided by ebook suppliers. The Library has catalogue entries for over 19,500 ebooks. In the case of both full text serials and ebooks, access is also provided via our gateway, SuperSearch¹⁰ (an ExLibris product) and specific pages¹⁰ on the website.

⁸ <http://orac.lib.uts.edu.au/>

⁹ Data at April 2004

¹⁰ <http://www.lib.uts.edu.au/finding/supersearch>

OPAC Usage

The catalogue is heavily used by clients. Within the Library a certain number of computers are dedicated to OPAC access alone, assisting those students and staff who want to do a quick catalogue search. The graph below shows the 671,044 catalogue searches performed over a month in 2004 by search type.

OPAC SEARCHES (671,044) April to May 2004

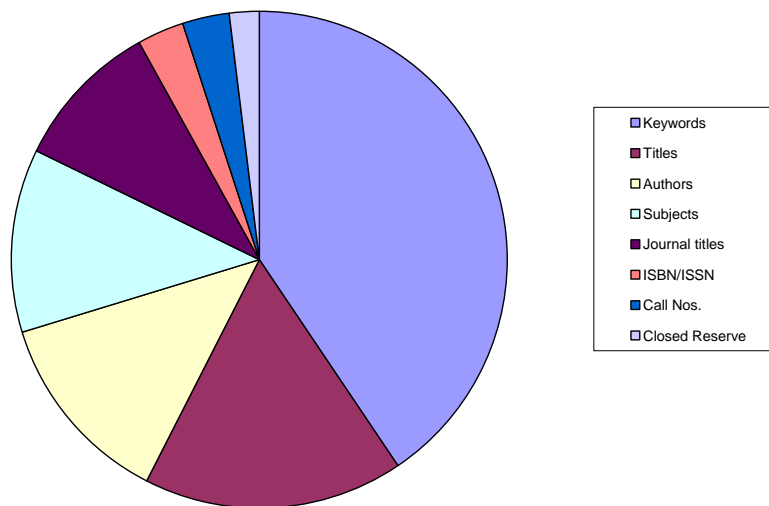


Figure 4: OPAC Searches by Type

There are discussions in the profession as to the suitability of MARC in cataloguing electronic resources. Other standards have emerged, notable among these is the Dublin Core Metadata Initiative, for cataloguing electronic resources. At UTS Library, we have formed a Metadata Working Group to consider how we can use Metadata, such as Dublin Core, to enhance access to our electronic resources. The jury is still out on this matter. While a lot of work is in the literature about the DC schema itself, there is still a paucity of research into the value of metadata schemas, such as DC, to the information seeker.

SuperSearch: Gateway to Electronic Resources

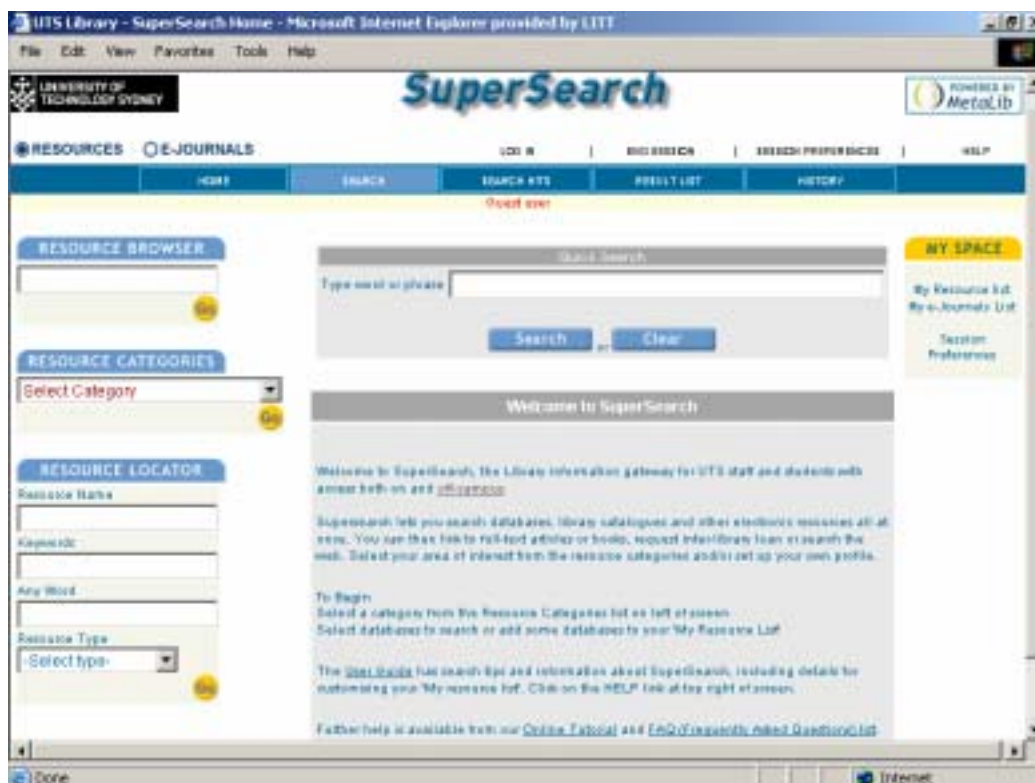


Figure 5: SuperSearch

“SuperSearch¹¹” is a single customisable gateway to the wide range of electronic resources. SuperSearch incorporates ExLibris Metalib and SFX technologies, and it was launched at UTS in 2001. UTS was the first site in the world to go live with the combined suite of Metalib and SFX products. UTS was also the first site in the world to use Metalib to access databases other than library catalogues. SuperSearch provides clients with a single identifiable and simple-to-use starting point for navigating the Library's electronic resources, and for accessing its growing collection of full text serials.

Metalib has given the Library the capacity to better manage its electronic resources for clients. SFX has provided the sophisticated cross-linking mechanism we required in order to greatly expand access to UTS' substantial electronic serials collection” (Flynn 2002). SuperSearch has enhanced the Library's services to clients in terms of:

- improved resource integration (single gateway)
- simplified navigation (standardised searching; standard results displays)
- subject portals (closely aligned to UTS's learning & research disciplines)
- customisable portals (e.g. My Resources, My E-Journals, Alerts)
- reference linking (SFX services).

It has also maximised use of the Library's substantial electronic collections. The graph below shows how clients have readily taken up usage of SuperSearch.

¹¹ <http://supersearch.lib.uts.edu.au/V>

UTS Library's SuperSearch Uptake, 2002 +

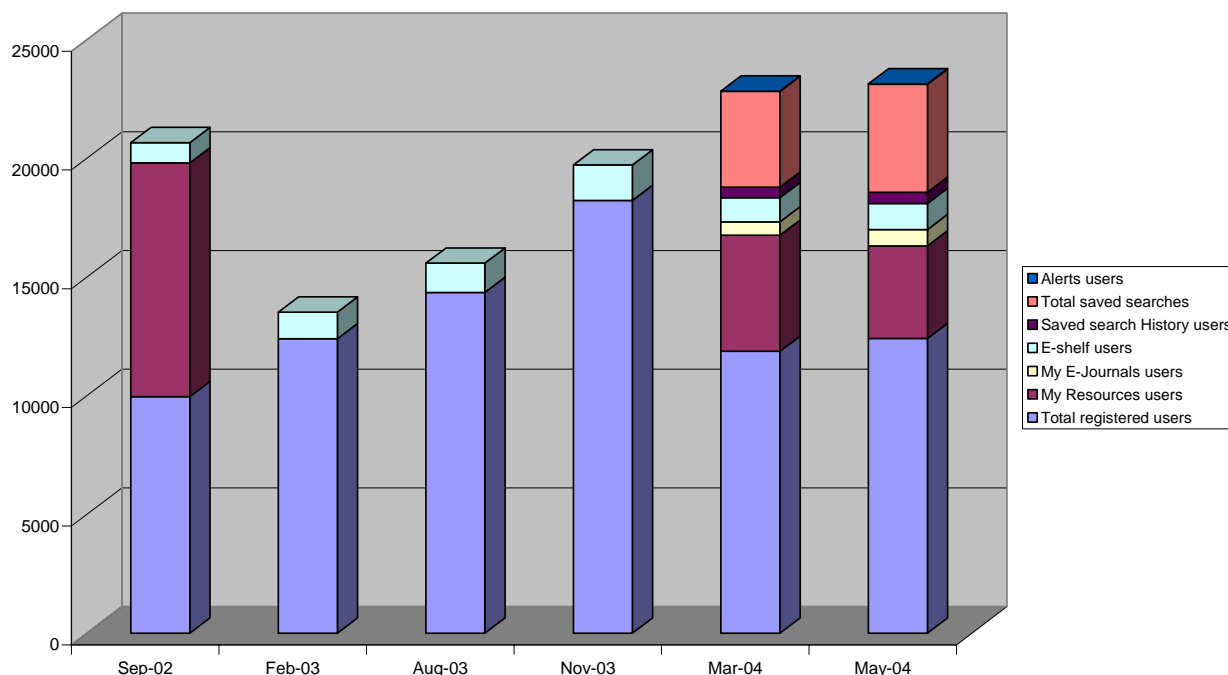


Figure 6: SuperSearch Uptake Graph 2002+

eResource

In the card and early online catalogue systems, librarians worried about and avoided orphan headings. Now the concern is for dead links, i.e. links to URLs which do not exist or where the resource has moved. The web is characterised by the transience of data. A challenge for the digital libraries is to implement systems which automatically monitor these links to ensure that the client is not led to follow blind paths, hence the development of PURLS, or persistent URLs, and the implementation of link tracking systems.

At UTS we are developing eResource to overcome some of these issues. It is an in-house system the aim of which is to provide one place where links to electronic resources can be registered and updated in order to speed up the process for providing authenticated access for off-campus users: an in-house DOI service. Once an eResource record has been created, authentication to that electronic resource via Ezyproxy or Squid is established and can be updated if a change is made. All other links to that resource on the website (e.g. in OPAC) are then automatically corrected. When suppliers notify the Library that resource links are unavailable, a message can be added to eResource which is immediately visible to clients if they try to gain access to the resource.

DRR (Digital Resources Register)

Since January 1, 2002, all UTS digital resources for which academic staff or UTS do not own the copyright and are being communicated for the purposes of teaching and learning must be registered centrally through the UTS Digital Resources Register¹² (the DRR). When changes to copyright were enacted, the University community agreed that the Library should manage the University's digital resources to ensure that copyright obligations were not breached. The Digital

¹² <http://www.lib.uts.edu.au/services/drr>

Resources Register and Digitisation Service locates, creates and registers electronic copies of lecture notes, book extracts, journal articles and other print publications used for online teaching at UTS. The digitised copies are stored on a server which provides central record keeping to comply with Australian copyright law and the AVCC/CAL¹³ Part VB agreement. Academic staff can elect to have these resources made available to their students from UTSONline (the University's online learning program) and/or the Library's eReadings collection. Access is available on and off campus and restricted to UTS staff and students. Library Staff will:

- locate any material not supplied by academic staff from Library resources or through Inter Library Loan.
- convert material into PDF format, reducing file size for easy download and printing.
- check for copyright compliance and add the compulsory copyright notice.
- send an email to the individual member of academic staff with a link (url) to the file.

eReadings¹⁴

This is a reserve collection of digitised resources, including copies of journal articles, direct links to journal articles held in the Library's full text databases, book excerpts and lecture notes supplied by lecturers. All resources are checked for copyright compliance and are registered with the UTS Digital Resources Register before they are made available online. The access points for this service are the lecturer's name or the UTS subject name or number. Once authorised clients find the resource they are searching for, they can easily link to the print Closed Reserve collection or return to the Library's catalogue or website.

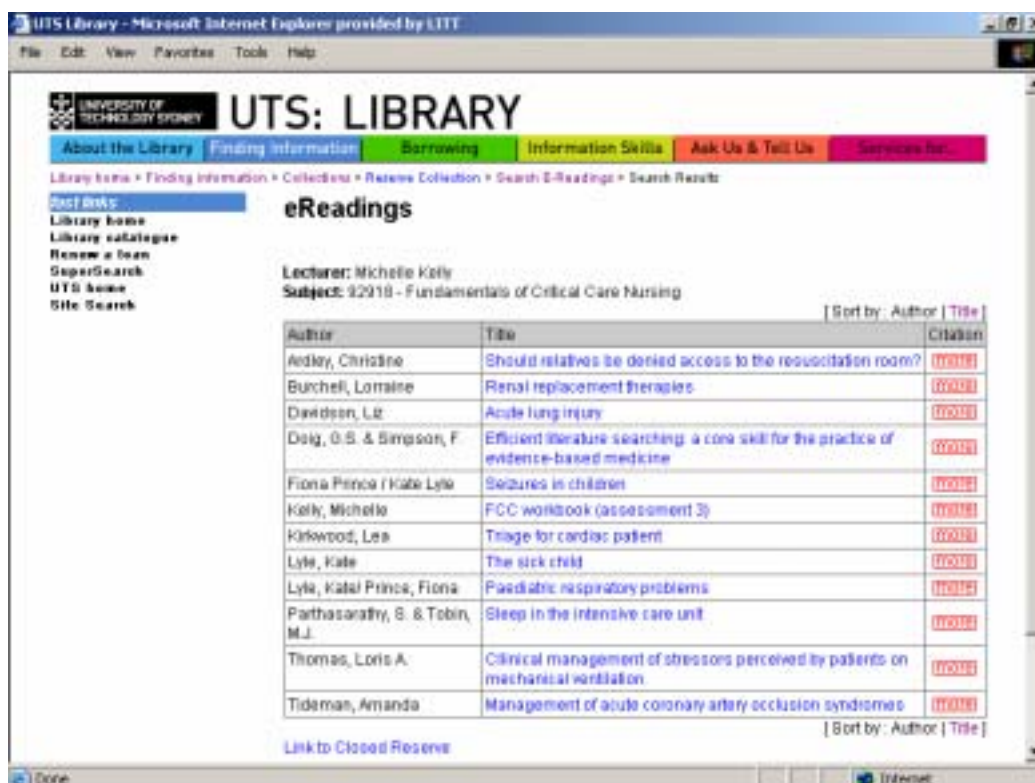


Figure 7: eReadings

Subject Resources

In an attempt to assist clients, particularly undergraduate students, to find all resources related to their course in one step, we have devised a Subject Resources¹⁵ page. By entering a UTS

¹³ Australian Vice-Chancellors' Committee / Copyright Agency Limited.

¹⁴ http://www.lib.uts.edu.au/finding/collections/reserve_collection?p=1533

subject name or code, students can find Closed Reserve, eReadings, course reading list materials and exam papers for their subject. Once students have found relevant course-related resources, they can return to the catalogue or find their way to another resource on the Library's website.

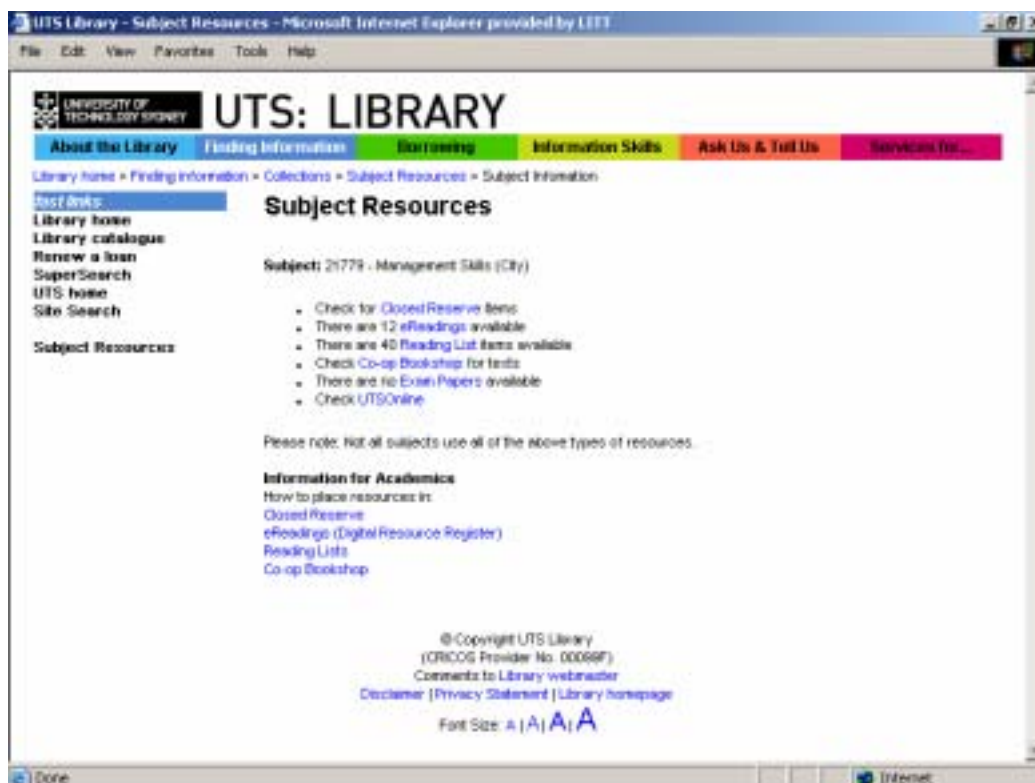


Figure 8: Subject Resources

Australian Digital Theses Program (ADT)

UTS is a member of the ADT a “national collaborative program which aims to establish a distributed database of digital versions of theses produced by postgraduate research students at Australian universities.”¹⁶ This service assists researchers by providing online access to Australian postgraduate theses. At the UTS Library access is available both through OPAC (for UTS theses) and via pages on the website.

The UTSePress

In order to enhance access to UTS research and to support scholarly publishing, we recently launched the UTSePress and an online journal called *PORTAL : Journal of Multidisciplinary International Studies*¹⁷. The UTSePress will host an array of local and international scholarly publications, including online journals accessible via the Internet. Both services were developed in collaboration with international experts from MIT and the University of British Columbia.

PORTAL : Journal of Multidisciplinary International Studies is the first e-journal to be delivered by UTSePress and shared the launch, which was conducted via a trans-Pacific link joining UTS

¹⁵ <http://www.lib.uts.edu.au/finding/collections/subject>

¹⁶ <http://adt.caul.edu.au/>

¹⁷ <http://epress.lib.uts.edu.au/>

with the Journal's Editor in Guadalajara, México. *Portal* permits full online peer-review of scholarship published in the journal in international, regional, area, migration, and ethnic studies.

As the UTS University Librarian, Alex Byrne, stated "UTS is not only committed to taking advantage of new technologies for publishing purposes, it also seeks to promote scholarship across a boundary-less world."

INTEGRATING SERVICES

In addition to the role of the Library's website in gluing the various components of the digital library together, UTS has a range of other programs which effectively integrate and bind its virtual services. These include: reference services, information literacy programs, IT infrastructure and last, but definitely not least, the Library's staff.

The Virtual Help Desk

When a client is in the Library and experiences problems with finding resources or with equipment, he or she can ask a member of staff to assist them. To replicate this situation in the digital environment is more complex. The Library's website has a prominent banner headed *Ask Us & Tell Us*. The services listed here include:

- ALIVE¹⁸ (Ask A Question LIVE), an online reference service
- Ask a Question¹⁹, an email reference service
- Contact Us²⁰ (provides a phone number for contacting the Library).

These services are the online version of a reference desk. From within the catalogue the SFX button also links to the *Ask Us & Tell Us* site so that online help can be provided when clients are searching OPAC.

Analysis of usage data showed that many ALIVE enquiries were received in the afternoon and evening. As a result, in 2003 the service was increased to 32 hours each week and extended into the early evening. The aim of extending the online reference service 24x7 has prompted collaboration with overseas partners to cover other time zones and continue the online service outside of UTS Library's service hours.

Strategies In Information Literacy Program

In the physical library, staff conduct information skills classes at specific times of the year. The equivalent digital service is provided by a variety of online tutorials:

- BELL²¹ (Being an Effective Lifelong Learner), a University-wide set of tutorials on aspects of learning and communicating
- Catalyst²², a Library research and information skills tutorial
- SuperSearch tutorial²³ to assist in making the best use of the Metalib/SFX gateway.

The online training tutorials developed as part of the BELL program are intended to train students so they become independently capable of seeking, understanding and utilising

¹⁸ <http://www.lib.uts.edu.au/askus/alive>

¹⁹ <http://www.lib.uts.edu.au/askus/askaquestion>

²⁰ http://www.lib.uts.edu.au/askus/contact_us

²¹ <http://www.bell.uts.edu.au/>

²² <http://www.lib.uts.edu.au/catalyst/index.htm>

²³ http://www.lib.uts.edu.au/information/online_tutorials/supersearch

information resources, including reference resources. The BELL project, developed with University seed funding, was a collaboration between Library and academic staff. One of the outcomes is Catalyst, an online Library research and information skills tutorial, which is accessible through the Library's web site and is used by librarians and academic staff to develop students' information skills. Catalyst modules have been incorporated into teaching programs and course assessments.

There is a range of online reference services, including dictionaries, encyclopaedias together with user guides for databases and other in-house tools like subject guides and FAQs.

Recognising the diverse needs of our culturally diverse user community, UTS Library has begun providing online and print-based services in some of the major foreign languages spoken by our students. Key web pages have been presented in Mandarin and some of the Library's printed brochures have been translated into selected foreign languages.

Enhancing Our IT Infrastructure

“The real story of digital libraries is the interplay of people, organizations, and technology.”²⁴

The Library has made a significant investment in its IT infrastructure and now offers access through about 350 desktop computers. The number of servers hosted and maintained has risen to 26. As no doubt many of you experience, users seem to have an insatiable appetite for public access computers. No matter how many we install, the demand just seems to exceed the available machines.

Senior staff and Information Services staff whose work requires them to travel and deliver classes and presentations outside the Library have been issued with laptops and USBs to recognise the increasing mobility of our staff and the value in taking our staff to where the client is.

24x7 service delivery is becoming increasingly the norm at UTS. Services are delivered directly to the user's location with the installation of information kiosks and scholars' centres in major locations on campus. While these satellite stations are not full branches, they are supported by a limited staff presence.

The cost of underpinning technology, especially hardware, may be going down, but one area that is perhaps less prominent is the cost in maintaining a digital library service. An increasing level of inhouse IT expertise is required to manage, maintain and develop online services and resources. UTS has grown from 3 IT staff members in 1996 to 8.5 EFT in 2004. When the Library staff undertake their annual planning review, almost every plan involves an IT component for which IT staff time must be budgeted.

Developing The Key Ingredient Of A Good Library System: Our Staff

Librarians in the digital environment need to become experts not only in the evaluation, acquisition, organisation and delivery of information but also in the diverse range of standards and protocols relevant to the delivery of information services. The set of competencies required of the librarian practising in the digital environment includes having a working knowledge of the standards relating to digital objects, document formats and indexing systems. It is not sufficient to know about DDC, LC, MARC, Z39.50, we also need to know about HTTP, PDF, SGML, XML, MPEG, JPEG, DC, DTD, DOI, OpenURL, etc.

Today's librarians also needs to keep up with developments in online scholarly publishing, open archives initiatives and how the disparate networked systems must be deployed to

²⁴ Arms, p.ix

maximise their interoperability and make it as easy as possible for the information seeker to get to the information relevant to their inquiry. They also need to have a basic understanding of contracts and licence conditions for the purchase of electronic databases, and a knowledge of copyright legislation in the digital environment.

At UTS we recognise that staff members must be given the opportunity to develop the skills needed for the digital library. A glance at our staff development calendar for 2004 shows that staff have attended or will attend workshops or seminars on, amongst others,:

- Challenges for Libraries in the Digital Environment
- Copyright Legislation
- Digital Rights Management
- International Lifelong Learning Conference
- Project Planning
- The Librarian as Negotiator
- Cataloguing Seminar: 'Revolution or Evolution'
- Metadata Hands On.

While we all are aware that the pace of our work life has become more demanding, it is essential that time and money be allocated for library staff to undertake training or attend conferences, like this one. It allows us to stand back from the focus of our daily work and to look at the developments in our profession and in related disciplines and see what we can learn from the achievements of others.

Challenge To The Profession

“Who can doubt that these are exciting times, pregnant with possibility?”²⁵

The digital age has significant repercussions for the education of library and information professionals. Pace observes “As library and information studies programs struggle for professional and structural stability in this new age of information, many have dropped the “L” word – library- from their titles” (Pace 2003, p. 97). He further states that “in a dot-com world, libraries no longer invent services; they learn the technology that delivers it, and struggle to integrate digital service models into an analog profession...This era will undoubtedly reshape the practice, pedagogy, and public perception of the information profession” (p. 98).

The continuing challenge for library staff is in ensuring the relevance of our services and resources. Gorman states “while the differences between analogue and digital data may be of degree more than of substance, they are sufficiently large to require different approaches. Libraries have to manage digital data alongside all the other kinds of information objects they manage, and they also have to manage the machines, a new departure for them. This has huge implications for the economics of libraries, it has implications for the profession of librarianship, and it has consequences for the relationship between library and users” (Gorman p. 6).

As librarians, we need to seize the new opportunities presented by communication and information technologies for designing new products and services. We need to increase our understanding of evolving user behaviour in the digital environment and how this impacts on the provision of information services.

With these in mind, two key engagements are paramount: research and collaboration. As a profession, we need to actively engage in research and collaborate with industry partners in developing practical outcomes from this research for the benefit our staff and clients. Moreover, recognising the many aspects associated with the provision of digital services, an essential

²⁵ Levy, p. 118

component of the way we operate should be collaboration with colleagues from other sectors and other disciplines, if we are to maximise the value derived from our limited resources.

Bibliography

Arms, W Y, 2000, *Digital libraries*, The MIT Press, Cambridge, Mass.

Berring, R C, 1993, 'Future librarians', in R H Block and C Hesse (ed), *Future libraries*, University of California Press, Berkeley, pp. 94-115.

Borgman, C L, 2003, 'Designing digital libraries for usability', in A P Bishop, N A Van House and B P Buttenfield (ed), *Digital library use: social practice in design and evaluation*, The MIT Press, Cambridge, Mass, pp. 85-118.

Shaw, LS & Prescott, A (eds) 1998, *Towards the digital library: the British library's initiatives for access programme*, The British library, Carpenter, London.

Deegan, M & Tanner, S, 2002, *Digital futures :strategies for the information age*, Neal-Schuman, New York.

Dempsey, L 1998, 'Afterword: places and spaces', in Carpenter, L, Shaw, S & Prescott, A (eds), *Towards the digital library: the British Library's Initiatives for Access programme*, The British Library, London.

Flynn, A 2002, *SuperSearching at UTS, Australia: Implementing Metalib/SFX at the University of Technology, Sydney*. Paper presented at ExLibris Seminar, Cyprus, April 2002.

Gorman, GE (ed.) 2002, *The digital factor in library and information services* Facet Publishing, London.

Griffin, SM 2000, 'NSF/DARPA/NASA Digital Libraries Initiative: a program manager's perspective', in S Harum and M Twidale, (eds.), *Successes and failures of digital libraries*, Graduate School of Library and Information Science, University of Illinois at Urbana-Champaign, Champaign, Ill., pp. 4-11.

Lee, SD 2002, *Building an electronic resource collection: a practical guide*, Library Association Publishing, London.

Levy, DM 2000, 'Give me documents or give me death: a millennial meditation on documents and libraries', in S Harum & M Twidale (eds.), *Successes and failures of digital libraries*, Graduate School of Library and Information Science, University of Illinois at Urbana-Champaign, Champaign, Ill., pp. 118-126.

Marchionini, G & Plaisant, C & Komlodi A 2003, 'The people in digital libraries: multifaceted approaches to assessing needs and impact', in AP Bishop, NA Van House & BP Buttenfield (eds), *Digital library use: social practice in design and evaluation*, The MIT Press, Cambridge, Mass., pp. 119-160.

Nunberg, G 1995, 'The paces of books in the age of electronic reproduction', in R H Bloch, C Hesse, (eds), *Future libraries*, University of California Press, Berkeley, pp.13-37.

O'Day, VL & BA Nardi 2003, 'An ecological perspective on digital libraries', in AP Bishop, NA Van House and BP Buttenfield (eds.), *Digital library use: social practice in design and evaluation*, The MIT Press, Cambridge, Mass., pp. 65-82.

Pace, AK 2003, *The Ultimate digital library: where the new information players meet*, American Library Association, Chicago.

Wedgeworth, R 2000, 'Technology transfer in a public university', in *Successes and failures of digital libraries*, Graduate School of Library and Information Science, University of Illinois at Urbana-Champaign, Champaign, Il., pp. 80-84.