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Library Involvement in Remote Learning: Framework for Integration of Services

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Abstract

Technological support for university education is now such that online support for education is diminishing the distinction between on-campus and distance education students. Library services to remote students have for some time focused on document delivery, information literacy and reference service. This investigation comprises an overview of research that is pertinent to such services, followed by elements of a proposed framework for library involvement in remote education

The analysis includes an overview of services provided by respondents to a survey of all Australian university libraries. The framework is developed from this overview, followed up by case studies of several Australian university libraries that have well-developed services for remote students, in order to suggest a best practice model for integrated online services.

Introduction

Libraries have been managing support for distance education since well before the days of online networks. Procedures for delivery of hardcopy resources, and collaborative approaches to provision of these resources are well established. Intermediation – the connecting of library users with appropriate resources – has always been undertaken through reference service provision and document delivery. Until relatively recently, there has been less attention to educating remote users in how to access and use collections themselves.

In the online era, intermediation persists. Now it is accompanied by greater emphasis on provision of self-instructional support for education on how to use digital resources. This educational approach has been complemented by support for library users per medium of virtual or digital reference services, and by more sophisticated approaches to document delivery, including digital delivery.

Awareness of information resource management principles is important for educators moving into increasingly resource-based educational domains. Similarly, awareness of educational principles is important for librarians and information professionals, as they progressively engage with instructional interfaces.

Prevalence of online resources diminishes the distinction between distance and on-site education. There are increasing numbers of local (that is, on-campus) users who exploit online facilities, diminishing class and library attendance. In library terms, they comprise what are called here remote users, where *remote* is used to imply either a distant *or* a local, but not in-person use of facilities.

A characteristic of flexible and blended learning approaches (where online and face-to-face instruction are consciously planned in combination), is that instruction within a discipline converges with accompanying information resource provision. As remote participants engage in courses, they are increasingly able to obtain associated direct access to hybrid collections[i]. Organisation of these collections to facilitate access is challenging. Although retrieval software may be straightforward to use, its *effective* use can be improved by access to online instruction for users seeking to understand information organisation.

Librarians recognise that remote users are not necessarily distant and are coming to terms with provision of appropriate services. Libraries may benefit from a blueprint that provides direction for effective integration of services for such users. This should lead to a model for planning support, particularly in order to contextualise resource provision and information literacy[ii] within the learning experience of whatever discipline students are pursuing.

This report is part of an overall study that in order to develop such a model, investigates approaches to information services, and resources, along with instruction in the use of these services and resources that are provided online to remote users. The term "online service" is

used to cover both provision of information, and instruction in its provision and use. The investigation is confined to the higher education environment.

This part of the study reports upon an overview of services provided by Australian and New Zealand university libraries, and then focuses upon some practices employed in several Australian libraries that have had ongoing major commitment to distance, and now remote education support.

The study attempts to establish principles for how instruction and complementary support should be applied most appropriately for effective application and use of information resources. It is undertaken within a context of a diminishing distinction between off-campus and local use. This environment means that librarians find that it is increasingly necessary to complement face-to-face information literacy instructional programs, with impersonal online delivery of resources and instruction in use of these resources to both remote and in-person users.

Library Support for Remote Users

Higher educational procedure increasingly involves academic guidance and mentoring, rather than lecturing. It is associated in libraries with a shift that has been called a move from gatekeeping to greater responsibility for 'empowerment of the client' (Ferguson & Ferguson, 2005). This 'client' may well be an undifferentiated remote or local user, and there is a significant history of support for the remote user at a distance.

In a bibliographic review, Cooper, Dempsey, Menon, & Millson-Martula (1998) define distance learners as a subgroup of remote users. From synthesis of the literature, they surmise that all remote users seek constant access to online databases mounted on user-friendly systems and help desk or technical support. Further, the remote user seeks a personal relationship with library staff like a customer-business relationship, and extensive information describing specific resources services available at the host library.

Provision of library services for distance education students is a mature practice. Guidelines for undertaking the service have existed for some time and have been modified as services progressively became online. For example, in the USA, ACRL (Association of College & Research Libraries, 2004) enumerates "essential services" that include reference assistance; provision of network access; consultation services; and are termed library user instruction programs. Numerous accompanying examples of documentation are recommended. These include statements of policy, mission and purpose; use and automation statistics; and evidence of involvement in curriculum development and planning.

In addition to such professional guidance, there are manuals that advise on provision. For example Goodson (2001) summarises model programs and emphasises identification and provision of resources, as do Noah and Braun (2002) with greater emphasis on education.

Watson (2003) has produced an online guide in which she identifies responsibilities such as ensuring that services conform with accreditation requirements, and including librarians on distance education course teams.

Services typically include document delivery, information literacy instruction, and reference assistance. In the case of the latter, online services has been developed in a number of guises by libraries. They can be seen as a natural extension of telephone reference service. Many of the characteristics of call centres operated outside a library environment. When a service is facilitated via the Web, it may take the form of structured sites that guide Web users to reference material. For example *Librarians Index to the Internet* has an area that directs users to ready reference and quick facts.[iii] Services like these compete with commercial services such as *xrefer*[iv] which is in turn used by libraries.

An alternative approach is to provide human intervention services that go under various names such as digital reference, electronic reference, *24/7* or *Ask-A* services. Many of these services do not provide for real time interactive responses; however they are often grouped under the name virtual reference. As such, they complement document delivery and are supported by user self-instruction software.

Research into Library Support

Research investigations of library support are wide ranging. They include work that focuses on:

- Analysis of users and their needs.
- Approaches to education of library users.
- The process of information seeking in the online environment.
- Evaluation of services.
- The more generic aspects of interface usability.

Some examples of each are briefly reviewed following.

Library user needs

Arguing for a superior understanding of "customers" linked with the library's capabilities, Cooper et al. (1998) note that distance learners seek a greater range of services provided by library staff, such as conducting online database searches and preparing packets of information, with less emphasis on self-service; a variety of libraries in addition to the host library to complete their academic assignments; and a way to find what other libraries can do for them.

Research that focuses on distance learners' needs has often shown that they turn to local sources before those of the host institution. For example Stephens (1999) found that postgraduate students in the UK used library resources of different types more frequently in home locations, rather than availing themselves of host university services.

The question of which institutions have responsibility for provision of support services has long been a vexed one. However it would seem to be of diminishing importance as institutions increasingly provide full text digital documents online to students, the number of digital documents increases, and faculty leave behind earlier print-only versions as they are superseded by more current digital material.

Network availability and hybrid libraries have changed thinking to the extent that many librarians are now concerned more with provision of organised access to material, irrespective of its location, than they are with collection building. This approach has been accompanied by greater attention to empowerment of users to make use of the material effectively. McPherson (2001) among others, has indicated that librarians in higher education believe that they fill an educational as well as custodial role. This may well involve instruction on the production, organisation and evaluation of the documentation of a student's discipline together with instruction on effective organisation of a student's own records.

Education of library users

Programs for introducing students to the published documents of their discipline have been offered for many years under the rubric of reader education or library instruction. Delivery of library education programs in the online era has led to reconsideration and a conceptual broadening of this process, which is now sometimes subsumed under the broader approach of information literacy instruction. Information literacy standards have been promulgated, for example by ANZIIL (Bundy, 2004), that define information literacy and articulate an approach to produce a person that has this quality.

As online instruction is developed as part of information literacy initiatives, there have been attempts to evaluate its effectiveness. For example, in the U.S. Curtis (2002); Pival & Tuñón (2001) and Kelley, Orr, Houck, and Schweber (2001) all provide examples of evaluation of Web-based remote library use. In Australia, there have been studies that report evaluation of information literacy with respect to remote users (Churkovich & Oughtred, 2002; Drew, Abbott, & Orr, 2001).

Information seeking in an online environment

Evaluation of such user education programs for remote users needs to be informed by the vast research corpus on information retrieval. This has grown from experiments in batch online searching of databases in the 1960s. For a long time it was system-centred and principles in this area were well-enunciated by the 1980s, for example by Salton and McGill (1983). Much of the development of database text retrieval software and search engine software has made use of such principles.

In more recent years, research has become more user-centred, influenced by research in information seeking behaviour of groups within particular domains of subject material, and particular levels of need in mind, and therefore different cognitive and affective approaches. Details of this area of research are provided for example by Allen (1996) and Case (2002).

The user-centred approaches may be applied to particular sites or particular tools. For example, an evaluation of a library site was undertaken by Robins and Kelsey (2002). They assigned tasks (searching for known items) to subjects to determine the extent to which the site's navigation system facilitated locating information. Analysis of the way that search engines are used has been undertaken by means of transaction log analysis (Jansen, Spink, & Saracevic, 2000). Su (2003) has been endeavouring to develop a general model for user evaluation of search engines expressed in terms of relevance, efficiency, utility, user satisfaction, and connectivity.

What do users want to learn? From a library viewpoint this is sometimes characterised by whether they want ready answers to reference questions, or have more complex research questions. These latter may be researched in detailed manner by librarians, but in educational environments, they endeavour to forestall such requests by information literacy training, and providing resources in an organised manner that may be used effectively by an information literate learner.

Library service evaluation

A complete issue of *Library Trends* (Haricombe, 1998) has been devoted to examination of services to remote users. It contains material that emphasises the use made of service, as well as papers that emphasise management of the service.

Where service is essentially online, there is a need to take account of digital library evaluation criteria. These have been examined at length by Saracevic (2000). He firstly considers the difficulties of defining a digital library, then canvasses the range of definitions. Saracevic itemises many constituents as candidates for evaluation, and posits system-centred and user-centred contexts for these. These include elements typically evaluated in conventional library programs such as staffing, management, organisation, collection and physical storage. Many of the parameters appropriate for conventional library evaluation (Lancaster, 1993; Saracevic & Kantor, 1997) may also be employed in digital libraries. If the user-centred approach is to be pursued then the support mechanisms may come through library staff support through a digital service, or via structuring of an interface so that the educational support is via the entrance structure to a digital library.

Meola and Stormont (2002) exemplify different models of virtual reference service, and suggest approaches to evaluation. For all models the evaluation includes consideration of software and staffing. A recent issue of *Computers in Libraries* (Dempsey, 2003) includes a number of cases that are described for the benefit of practicing professionals rather than with research orientation. Nevertheless, there are anecdotal pointers to evaluation. The work of Smyth (2003) is more analytical. She examines the transcripts of online reference interactions, characterises them according to a reference framework, analyses the extent to which instruction takes place in a reference setting, then attempts (with limited success) to map them to an information literacy framework.

The literature of call centre evaluation can also contribute something to library reference. For example Feinberg, Kim, Hokama, de Ruyter, and Keen (2000) in a survey of over 500

centres, identified seven critical variables (from a candidate group of thirteen) that could be used as determinants of user satisfaction. However, the intensity of the relationships established was low and when used as predictors of satisfaction, only two of them were significant causal agents. These two: "percentage of calls closed on first contact" and "average abandonment rate" may also provide indicators for virtual reference.

Interface usability

The development of the Web on the Internet as an information dissemination facility has led to a literature of Website evaluation, sometimes expressed in terms of usability (Alexander & Tate, 1999; Nielson, 2000).

Websites established as gateways or portals may be library sites that organise access to resources with respect to particular communities of interest. Educational support may be provided per medium of annotated links, online tutorials, FAQ (Frequently Asked Questions) pages, customised portals for specific subject areas, site architecture for improved navigation, forms interfaces to databases, and entrance to support services that have online responses such as chat room, video-channel connections, email, or other Web-based telecommunications such as telephone from a distance.

When the emphasis on usability criteria is oriented towards libraries and instruction (Association of College & Research Libraries Instruction Communication Committee, 2004), typical educational objectives promoted include having an outline of objectives and outcomes clearly to establish purpose and realistic expectations; and including interactive exercises such as simulations, object manipulation and quizzes.

Other general educational approaches that are applicable to the library environment, include giving attention to the concepts behind procedures so that information skills become transferable; and more mundanely, providing librarian contact information. The more challenging recommendation is to seek ways to encourage faculty to link Web-based instruction to a course assignment for immediacy and relevance.

Another group within ACRL has subsequently developed selection criteria for peer review of instructional materials that are entered into a database, PRIMO (Association of College & Research Libraries Emerging Technologies in Instruction Committee, 2005). Their 8 criteria are similar to those of the other ACR group (for example "the content and language of the material are clear and effective"). However they haven't been derived from the earlier objectives.

Concepts of learning theory and contributing attributes such as collaborative climate, methodological variety, and personal motivators and preferences may also be addressed (Golian, 2000). With respect to online instructional design she emphasises knowing desired learning outcomes; developing instructional strategy; planning organisation of content; and developing an evaluation plan. She goes on to propose approaches to Website design that

account for these including: stating educational objectives; explaining how learning needs will be met; and exemplifying with real-life applications.

Each of these areas of research contributes to the development of better models for service provision. This study aims to provide guidance in the form of a consolidated framework of elements to be addressed for effective provision.

Method of investigation

A preliminary survey was conducted of CAUL (Council of Australian University Libraries) libraries which asked questions about their involvement in Web-based information literacy education, virtual reference service, and repositories of full text course material. The membership comprised the 40 University libraries in Australia, but the material was also administered to the 6 New Zealand University libraries on the CAUL mailing list. Twenty six responses were received from Australian and 3 from New Zealand for an overall response rate of 29/46 (63%).

This scoping survey was then used to approach a number of respondents in order to undertake case studies of particular organisations. At this stage three case studies are underway. They are being undertaken using a focus group interview of key organisational staff followed by consultation of relevant documentation and access to internal views of interactive material being developed for online users. To date these interviews have taken place at University of Southern Queensland (USQ), Southern Cross University (SCU), and University of South Australia (UNISA).

Survey results

The initial survey was conducted with the cooperation of CAUL and a summary of responses is shown in Table 1-1.

Table 1-1

CAUL survey results.

N=29 (63%)	Software support		
Library service	Web interface	Commercial software	Software developed in-house
Information literacy tutorial	28	17	12
Virtual reference application	26†	18	3
Digital repository to support courses	18$^\#$	9	3

† Where Web interface is provided without software support, it is for entry to an email facility.

\# Where Web interface is provided, some responses have not made clear what type of software is use to organise the repository

Proposed framework

As libraries increase their involvement in online learning, we are beginning to see attempts to outline the essentials of their contribution. For example Doskatsch (2004) makes reference to a need for a conceptual shift from a library-centred view of information literacy, understanding of different learning styles and learning management systems, and the ability to facilitate information literacy in a hybrid environment. Similarly Abram (2004) provides a brief checklist approach to e-learning support.

This suggests that a more developed approach would be useful for guidance to libraries so that they may frame their approach to involvement in course provision.

Elements of a library support model

The investigation to date has suggested preliminary constituents of a framework for service that a library should address to ensure effective involvement in remote online education. An overview of these elements is given by Middleton (2005). Here the constituents of each element are explained.

1. Information strategy

Educational institutions increasingly are advancing information management strategies that comprise information policy with respect to matters such as content management, recordkeeping, preservation and access to all types of information artefacts. Libraries must operate within this framework to advance systematic involvement in online education support for academic units. This planning should incorporate policy developed to address library role in the online learning environment in areas such as: *differentiation* of service; *contextualisation* within courses; and *resource provision* and *training*.

1.1 Differentiation

The library environment should minimise the distinction between on and off campus services. For example, to follow the sentiments expressed at UNISA

> *what we are looking for is a whole range of tools so that the reference librarians ... can refer students to so they can in many ways contextualise what they are doing for them ... a standard set of tools that they can use, so their level of service becomes consistent and we are not inventing things or developing things to suit the on-line environment. ... flexible library services is a whole library approach, not just a distance education approach. So what we needed then was some consistency over the whole library about the tools that the virtual reference team or the 'Ask' team would refer students to ... hence the bulletin board; hence using things like Infogate and then the team can respond to the person and their individual need, but also then refer them on to something where they can do some further study or further work without having to continually call back* (UNISA focus group, 7th December, 2004)

1.2 Contextualisation

There is a place for generic library services, and there are many examples of these being implemented effectively. These range from self-instructional software for information literacy such as PILOT based upon the information literacy framework at QUT, to others such as LITE using WebCT as employed at Murdoch University (Council of Australian University Librarians, 2004).

However, general purpose approaches should be complemented by the contextualisation of material within courses. This has the potential for engaging students with respect to their disciplinary material as suggested for example at USQ (Linhart, 2002).

1.3 Resource provision strategy

Many libraries have developed their acquisition policies in the digital era so that they encompass a range of formats of information media, and make provision for both collection development and access to digital resources. Such collection development policies normally include elements such as the approaches to working within a defined budgetary framework, building subject areas within defined scope, complementing abstracting and indexing services, and monitoring publisher and supplier reputation.

Where digital resources are employed in the online learning environment, attention should be paid to systematic evaluation of these resources to see if their use justifies cost, taking into account factors such as:

- Currency of databases and the regularity with which they are updated.
- Extent to which they contain full text of items that are referenced.
- Functionality of interfaces.
- Ability of software to provide statistical reporting on use.
- Availability of instructional materials for explication of databases structures and software interfaces.
- Extent to which retrospective material is available; how it is maintained online; and what alternative avenues (for example consolidated journal repositories, eprint servers, CDROMs) exist to archive material.
- Licensing issues so that lease or purchase arrangements are reconciled, so that off-campus users are provided for and that validation facilities are available for external users to mirror what is available on-campus.

1.4 Training

Libraries should provide a framework for training of online users (see Information literacy below), and for training of those who train them.

2. Information organisation

In their role as repositories, libraries have a long history of developing standards for describing information artefacts. Most notably this has been accomplished through cataloguing rules and classification schemes. The advent of computer-based services saw both classification and cataloguing being embodied within metadata, with the most prominent format being MARC (U.S. Library of Congress Network Development and MARC Standards Office, 2005). MARC continues to be developed, but now takes its place within an Internet environment where other frameworks for metadata in a variety of environments are being utilised.

Organisation of access to information resources for the remote environment builds upon development of online public access catalogues (*OPACs*) and enhancement of *description of resources* in their various formats.

2.1   *OPACs*

OPACs must now be flexible enough to deal with formats that have been developed for description of Web materials such as the Resource Description Framework (RDF) (W3C, 2004) developed using XML syntax to enable description and interchange of information about Web resources.

From a remote learning viewpoint an OPAC can be a link within the context of courses being delivered, so that students may regard it as the pointer to the general repository of any material additional to which they are directed from within a particular course. Therefore, in addition to providing a link into all library holdings that are referenced, it is desirable for the OPAC to point also to items in repositories that have been digitised by the institution (for example course materials), and items in collections to which the institution subscribes (abstracting or full text databases).

2.2   *Description of resources*

Libraries need to be aware of metadata applied in a variety of contexts. Initiatives such as the Dublin Core Metadata Initiative (DCMI) have developed a framework for self-description of Web resources. Of particular relevance to online learning is the Learning Technology Standards Committee Learning Objects Metadata (LTSC-LOM) Working Group of the IEEE (IEEE Learning Technology Standards Committee, 2005), and its association with DCMI. IEEE has produced a standard 1484.12.1 (IEEE Computer Society, 2002) for learning object metadata.

The standard presently provides for detailed metadata under a number of broad categories that include: technical requirements/characteristics; educational, for pedagogic characteristics; and rights, for conditions of use.

The LOM standard is one among many being utilised for digital description. In Australia a metadata application profile (Le@rning Federation) has been developed

with the aims of managing files and learning objects, describing their educational purpose and value, enabling interoperability between information systems, and controlling the associated digital rights. Another example is that developed by ADL (Advanced Distributed Learning). ADL is a North American collaboration between government, industry and universities to establish a distributed learning framework for interoperability of learning tools and course content. Their mechanism for achieving this is SCORM (Shareable Content formerly Courseware - Object Reference Model).

It is necessary for 'crosswalks' to be developed (Lightle & Ridgway, 2003) that enable standard formats to be mapped to each other for consolidated displays. Libraries must lead in developing the metadata bridges before the crosswalks arrive, and in implementing the crosswalks when they are produced.

3. Collaboration

The higher educational environment provides many opportunities for collaborative work. However, these must address the challenges of boundaries established by academic disciplines, and boundaries demarcating educators and support staff. They also depend upon the cultivation of good interpersonal skills. When library staff are able to present themselves to faculty as being versed in education and training (such as through higher education certification courses), they are better placed to work contextually. For example, they need to be familiar with different learning styles, the academic requirements of learning and the connection between teaching styles and learning approaches.

Collaborative approaches include working in teams with academics and instructional designers on *course development*, and providing *resource provision* and current awareness for learning delivery developments. There may also be *technical collaboration* such as with access security.

3.1 Course development

A positive aspect of change management is the opportunity it provides for establishing new partnerships. The library's role in university infrastructure positions it well to foster relationships between disciplinary areas, as well as with course developers. The extent to which this is possible may depend upon administrative structures. However so many universities now incorporate different arms of information (library, information systems, learning management systems, instructional design) under one chief information administrator, that barriers to infrastructure cooperation should be diminished.

3.2 Resource provision

Library current awareness services (section *7.1*) normally focus upon disciplinary content in order to support research programs and curriculum content. However, they also have a role to play in supporting process. There is considerable potential for

reporting to academics on teaching and learning method applied in their disciplines, particularly with respect to the availability of learning objects.

Within the framework of the strategic approach outlined at 1.3 above, librarians may complement the current awareness with resource provision advice for course developers so that specific e-books, e-prints, or learning objects may be considered for course development.

3.3 Technical collaboration

In providing database access, libraries have experience with user authentication, and may use this to development Internet protocol and password identification facility for access to remote learning support.

4. Information architecture

Information organisation undertaken using various applications of metadata should be complemented by design and provision of navigation for effective access to resources. The business community continually tries to avoid developing silos of information that are not interconnected. The academic community must deal with the same issues.

These may be addressed by attention to the design of *content management* systems supporting publishing, by provision of *discovery mechanisms*, and by *integration of resources* through links to special resources at point of requirement.

4.1 Content management and publishing

Libraries have been in the practice of providing access to content (their collections), rather than creating their content. To the extent that they create content, it is per medium of tools such as pathfinders, library use instruction, subject and database orientations and similar guides to the collection content, such as at SCU (SCU focus group, 3rd November, 2004)

Library Web sites have provided greater opportunities for developing and maintaining library's own content, particularly by making use of databases for updating content (Yu, 2005). However, in a recent report on the use of digital library repositories to support reusable course content (Digital Library Federation, 2004), it was noted that to date there have been few opportunities for digital library and course management developers and commercial information providers to talk systematically about areas of intersection. It was found that the various communities did not have a shared understanding of the larger environment.

In the Australian context Harboe-Ree and Treloar (2004) have pointed out the opportunity for libraries to adopt an information management leadership role in order to promote the integrated institutional use of digital material. However, they note that

there are continuing barriers including: unwillingness by libraries to redefine their role to manage internally produced content (or produce that content themselves); a lack of resources to undertake a redefined role; the volume of data that could be coordinated or published; a lack of institutional support; and a lack of the particular technical expertise required.

In addition to developing their own content, libraries are in a position to promote electronic publishing. For example this may be by support of scholarly communication through open-access availability on such facilities as e-print servers.

4.2   Discovery mechanisms

Learning objects should be treated in the same way as other information artefacts. Bibliographic description through information organisation metadata (section 2 above) should be connected to enable potential users to come across material through OPACs or portals.

Librarians have expertise in providing for federated search protocols that enable searching of multiple databases, accompanied in some cases by elimination of duplicates. They should establish these facilities in relation to particular courses so that databases specific to the courses (perhaps a combination of those internal and external to the institution), may be searched.

With respect to digital resources, librarians can make use of the OpenURL standard to enable users to arrive at copy of a resource providing they have authenticated rights to it through their institution, or at least to connect the user to a document delivery service in order to request the material. Persistent links can be established from records in aggregator databases to corresponding documents available to authenticated users. At USQ, their DocEx facility provides for federated searching to seamlessly link with the OPAC and document delivery for remote students (Jeffries & Lowe, 2005). At Auckland University (Flaherty, 2005) a project, 'Cecil', is underway to build a course resources database with dynamic links to content, with shared content development by subject librarians and teaching staff so that there is a learning rather than library focus to available material.

4.3   Integration of resources

Library management systems typically embrace special functionality such as access to electronic books, film reservation, document delivery systems and reserve collections. From the user viewpoint, the point of need may often be from within a course management environment. Therefore the links into such facilities must also be built from outside the library management system, either from course level or learning module level as appropriate.

5. Learning process support

Support that libraries provide in relation to discipline content and current awareness about developing teaching and learning processes, may further be complemented by assistance with the tools of learning processes. For example, provision of information management tools, and instruction in use of those tools:

- Bibliography maintenance so that users may maintain databases of references to be tailored for different referencing styles and report or publication insertion.
- Project management tools used in conjunction with group work.
- Report and essay formatting software that can be linked directly to point of requirement for course assignments.
- Guidance on information ethics so that instructions are available at time of requirement concerning attribution, plagiarism, software and media fair use.

6. Resource support and delivery

Libraries have traditionally assumed the role of repository for information resources and manage the delivery mechanisms for them. In many cases, the resources in question have long since ceased to be physical ones, and a great deal of attention is paid to provision of access to digital resources. Attendant with this, library role must increasingly include ways of *packaging resources*, providing *user assistance* in finding resources, *rights management* for resource use, and improving *avenues to resources*.

6.1 Packaging resources

Libraries should establish mechanisms for consolidated provision of course materials so that students may make use of them in print (course packs), or digital (online or CDROM) or both as they see fit. Within such a framework, they should be customisable to the extent that a student wishes them to be.

For example at QUT, students are able to make use of a digital course materials database that is constructed from academic requests by library staff who manage access rights. This database may be used for access by students within their course management system. As well, they are able to create consolidated printed output of whichever material they require (Callan & Cleary, 2005).

6.2 User assistance

Pathfinders were mentioned at 4.1 in the context of content management. They continue to be a fundamental tool for orienting users to material that is available to them. For online use they should include embedded links to all material that is available online, or to metadata describing the material (typically through the OPAC) if the resource is not available online.

6.3 Rights management

Librarians working in acquisitions areas have specialist experience with negotiation of contracts for materials. This experience has embraced subscriptions for online databases, and in recent years the complication of aggregators of databases, with the attendant complexities relating to retrospective material, full text availability and journals entering and leaving aggregated databases. This knowledge of licensing, intellectual property and digital rights management may be utilised with respect to learning objects and programs.

6.4 Resource avenues

Libraries will continue to maintain collections, and access to subscribed services, but must also provide guided avenues to other independent services, for example: bookshops (including campus bookshops for textual material); and sound, video or media resources, either as an avenue for streamed media content, or for purchase where appropriate.

At the University of Queensland delivery of digital content is managed at micro (subject specific) and macro (resource discovery and access) levels (Draper & Seivl-Keevers, 2005). Mechanisms include video streaming, audio playlists to support music courses from a music database, wireless connectivity, seamless authentication, and a project with the medical school for PDA (Personal Digital Assistant) delivery of information resources.

7. Communication

Ongoing communication with library users has traditionally been carried out by means of *current awareness* and *reference services*. Current awareness has in some applications been called selective dissemination of information, and in others environmental scanning. Whatever the terminology, there is implied an ongoing service that provides to a customer's desktop, notification about new material relevant to their interests.

7.1 Current awareness

This is normally based upon a user profile of information requirements. It may be established for concurrent searching of new additions to a range of databases and Web sites. Although many end users of such information establish and personalise their own profiles using such facilities as so-called push technology, library provision of broad scope services with multiple users continues to have a place. Such services are often oriented towards research groups, but may be complemented by less-research oriented services of the type facilitated by Blogs or RSS. These provide opportunities for libraries to reticulate Web resources such as news into course frameworks.

7.2 Reference services

Most libraries have extended their reference service into the network domain, at a minimum through support for email queries. They also make use of Web-based

facilities in order to forestall the need for queries as much as possible. FAQs are a common feature of support for many learning or knowledge-based systems, and may be used effectively in Library environments to develop information literacy. For example Flinders University employs FAQs (Council of Australian University Librarians, 2004) that are browsable, keyword searchable, or searchable by broad categories such as 'general reference' or 'library catalogue'.

With call centre or specialised reference query software becoming available, some libraries are also turning to such facilities, dubbed virtual reference services, in order to deal with queries interactively. Where these facilities are available it is important to provide opportunities at learning point of contact to "ask a librarian".

8. Information literacy

The process of library instruction has in recent years been situated within a broader framework of information literacy. Information literacy in the higher education arena is articulated as an understanding and set of abilities enabling individuals to recognise when information is needed and to have the capacity to locate, evaluate, and use effectively the needed information (Bundy, 2004).

Online approaches to library education are increasingly developed with reference to an information literacy framework. They take place in a hybrid environment – that is online and face-to-face options should be compatible and convergent. They may use existing software or develop their own for supporting self-instruction in information literacy. Some examples within CAUL libraries include:

- UQL Cyberschool as an outreach information literacy program to schools. It uses the program to cultivate school students' skills in preparation for university learning. The schools subscribe to digital (some full-text) databases at a discounted rate thereby expanding the amount and availability of quality information resources (Blumson, Fleming, & Turnbull, 2002).
- At QUT, the conversion of a face-to-face information literacy course, AIRS, to its online equivalent is described by Peacock, Tweedale, Fell, & Vollmerhause (2005). The course assists research students who are developing the literature review component of their thesis, and is a required course for students in research programs.
- At UNISA a course is being delivered to on-campus students by academics with library support using techniques suitable for remote delivery (Hiscock & Marriott, 2003). It makes use of a portal that provides: skills required to complete course requirements; lecture material; a reader; a journal for weekly reflections on the course and responses to questions; and introduction to non-electronic and electronic communication techniques for verbal and written communication.

9. Preservation

Digital repositories are proliferating to the extent that libraries have a role not just in facilitating access to digital information artefacts, but in undertaking programs to see that

appropriate preservation of objects take place. Centralised repositories such as Pandora (National Library of Australia, 1996 -), serve a particularly useful purpose in providing stable access to published ephemeral Web materials.

Although institutions routinely provide backup of course materials and learning objects, there is beyond this, a need for archiving learning objects. The methodical selection, description, control and differentiation of versions require control that libraries have the expertise to undertake.

In Australia, there is movement in this direction through COLIS (Macquarie University, 2002 -), a research program which has investigated incentives for the use of learning objects, developed metadata standards and vocabularies, and established a model for functionality of the objects that has been tested by a several vendors based upon a number of information standards.

Repository software development is now being undertaken to provide for managed enduring storage so that it supports preservation services for a variety of digital formats; persistent object identifiers, control of access and straightforward deposit procedures.

Networks of learning repositories such as *eduSource* in Canada provide some connection but there is such proliferation that guidance and standards for interconnection need to be pursued.

Conclusion

The elements of the preliminary model outlined provide a starting point for libraries that seek to immerse themselves within the challenging framework of remote education. Some examples are given that provide points of reference to can be employed to implement services. It is anticipated that as the case studies are further developed, then the categories that outline the elements will be refined, and that the elements themselves will in all cases be exemplified in order to indicate benchmarks for practice.

To this stage, only service providers have been consulted. The case studies will be extended to consult users undertaking online courses, and it is anticipated that this will add further refinement and changed emphasis to the model.

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[i] "Hybrid collections" implies online catalogues that provide seamless lookup of both digital and physical resources.

[ii] In this paper information literacy means the capability of recognising when there is information need, and how to locate, evaluate, and use effectively the needed information

[iii] This is a program of the Library of California at http://lii.org/search/file/reference

[iv] *xreferplus* at http://www.xrefer.com/ uses proprietary technology that integrates information from about 150 publications from 27 publishers through a network of intelligent, multi-dimensional cross-references.