

Beyond e-Reserve: Implementation of a repository-based reading list management system at the University of Western Australia

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Abstract

Developments in online teaching and learning have required academic libraries to rethink how they deliver course materials. An “electronic Reserve” to manage high demand digital materials is quickly becoming superseded by the need for electronic resources to be integrated into every aspect of online learning.

The University of Western Australia (UWA) has implemented an online repository to manage the course materials offered to students via unit reading lists. HarvestRoad’s Hive learning content management system allows University Library staff to store digitised extracts from books and journals, or URLs to online material such as articles offered via subscription-based services. Hive allows the Library to manage access control to this material, and includes mechanisms for managing digital content within the limitations of Australian copyright law.

In order to display items in a “reading list”, HarvestRoad developed the Resource List Management System (RLMS) for UWA. Prior to this, digitised readings were served to students via the Library catalogue’s Reserve Module through a service called “Course Materials Online (CMO)”. The RLMS goes beyond the traditional “e-Reserve”, allowing staff across campus to “take control” of their unit’s CMO lists themselves. Items can be added to a list from Hive or from the Library catalogue, and then arranged into groups according to a structure defined by the Unit Coordinator. Individual citations or the entire list itself can be set to appear and disappear automatically on dates chosen by teaching staff. The system has been designed to assist staff embed the use of online reading materials in the everyday teaching activities of their unit, whilst assisting the University comply with the edicts of Australian copyright law.

The implementation of both the Hive repository and the RLMS presented the Library with the opportunity to review the workflows and activities associated with delivering course materials and examination papers online and to put in place a new organisational model.

This paper will outline why UWA implemented Hive and the RLMS, gives an overview of how the systems function together, and describes the impact these systems have had on the Library and University as a whole.

The Emergence of Electronic Reserve

“Reserve” collections have existed for some time and are still widely used in academic libraries today. The concept of a “high-use” physical collection separate from the main library collection emerged as early as the 1870s so that students had access to high-use materials and ensured these materials could be managed easily (Austin, 2004, p. 3).

The extension of the concept of a reserve collection to the online environment coincided with the increasing use of technology in teaching and learning generally. The initial rationale for implementing an electronic reserve and the advantages gained are just as relevant today. They include the loss, damage or theft of items in physical reserve collections, improved access to items (24/7 access, access for regional or distance education students), increasing pressure on library space and the staff workload involved in maintaining reserve collections (Austin, 2001).

“Electronic reserves” or “e-reserves” emerged in the 1990s in the United States. Austin (2001, pp. 4-6) briefly describes the history of electronic reserves in the United States indicating that there was an experimentation phase (1991-1994) with only a handful of US libraries implementing some form of electronic reserve followed by a “proliferation of electronic reserves” in 1995-1999.

E-reserves began to emerge in Australian universities also in the mid 1990s. Queensland University of Technology Library implemented a system in 1996, using only non-copyright material due to concerns relating to legal issues and copyright (Smith, 1997). Monash University Library commenced work on an electronic reserve facility in 1995, adopting an approach taken by San Diego University to contact publishers directly because of copyright concerns (Groenewegen, 1997). At that time it was generally felt that “Copyright is arguably the most contentious issue for further development of electronic reserve in Australian academic institutions” (Smith, 1997, p. 320).

In 2001 a number of amendments were made to Australian copyright legislation which clarified the legality of making journal articles and book extracts available via the Internet without the permission of the copyright owner. This enabled a number of Australian universities to expand or introduce electronic reserves. According to a CAUL (Council of Australian University Librarians) information sharing exchange conducted by the University of Western Australia Library in January 2003, at least 25 Australian academic libraries were operating, trialling or developing some form of online “reserve” (Poleykett, 2003). Of the libraries surveyed the majority were offering their electronic reading lists via their Library Integrated Library Management System (ILMS) and this appears to remain true today.

The digitisation of course reserves has occurred at the same time as universities have moved more of their teaching activities online. As noted by Stubley (2005, p. 125), users of online courses expect to be able to link to the electronic full text of their readings from their Learning Management System (LMS). The digitisation of learning has forced the digitisation of library materials to support learning.

The Implementation of Course Materials Online at the University of Western Australia

In 2002 the UWA Library initiated a project to design and implement an online document management system primarily to support the online provision of course reading materials. As a minimum the system would store the reading material for academic units in an electronic form, and allow students to view these readings via a web browser. In early 2003, after surveying Australian academic libraries, the Library had defined the requirements for such a system and reviewed a variety of software products: local and international, commercial and Open Source. It then became clear that no single product could provide the full range of features that were required, and that to provide the complete platform was beyond the scope of the Library's budget alone.

An interim, "low-tech, low-cost" solution was developed utilising the Library ILMS – INNOPAC by Innovative Interfaces. This system provided just the core functionality required and in August 2003 the Library introduced a service offering digitised course readings via the Web branded "Course Materials Online" (CMO). CMO was an interim measure until funding could be secured for the University to purchase a more sophisticated learning content management system.

Although CMO proved very popular, it was very staff intensive to maintain, since all the copyright compliance and management work was manual and some components of the processing were decentralised. Metadata was captured and moved from one section of the Library to another on paper and in Microsoft Excel spreadsheets. Items were published in "blocks" as supplied by the lecturer, as opposed to individually, and therefore could only be processed as fast as the slowest item in the block. In addition, the use of the ILMS offered limited flexibility in terms of access, display and interoperability with the University's Learning Management System (WebCT). Access to a list in CMO was not intuitive as students were required to search for their unit, rather than browse. It was not possible to organise or group citations by relevance to the course, by week or by assignment, or attach annotations to citations and it was cumbersome to integrate the service with WebCT. Similar limitations of reading lists have been identified by the University of Sheffield Library (Stubley, 2005, p. 125).

In 2004 the University committed funding to meet copyright compliance requirements. It also provided the Library with the opportunity to seek a solution that would meet the full range of requirements.

The Learning Resources System Project

The Learning Resources System project was initiated to "implement a course-related materials management system that facilitates the online teaching and learning activities of the University." This was deliberately similar to, but broader than, the scope of the Library's interim CMO project. The LRS project sought solutions for the following four key areas:

1. A digital object repository (DOR).

The DOR would store and manage the digital objects. The UWA definition of a digital object was quite broad; it could encompass a scanned book chapter, a link to an online journal article, a digital photo, an audio file, or lecture notes in Microsoft Word format. The DOR would be responsible for receiving the object from the contributor and making it available online. The DOR would control who could access each object and manage the object

throughout its life cycle, allowing new versions to be created and descriptive metadata to be collected.

2. A Resource List Management System (RLMS).

The RLMS was envisioned as an interface sitting atop the DOR. The purpose of the RLMS was to use the DOR's objects for a particular application: the presentation to students of an electronic version of their unit's reading list. As well as describing objects in an easy-to-digest citation-like format, the RLMS would also offer the lecturer a suite of functions which would allow the reading list to be embedded in the unit's teaching activities. These functions will be described in more detail below.

3. A Learning Content Management System (LCMS).

Whilst some objects suited display in a reading list, others would not. The LRS would need to be able to store objects which were used primarily within the University's LMS, WebCT. Repositories which store content for use in a LMS are often called a Learning Content Management System (LCMS). The LRS would need to include functionality found in a LCMS such as support for the IMS/SCORM standards.

4. A copyright management module.

The management of objects copied under the provisions of the Australian Copyright Act was a primary concern for the project. The Act allows extracts from copyright-protected works to be copied and communicated to students within limits. The LRS would ideally be aware of these limits and facilitate the University's management of these objects. It should also allow the University to easily report on its compliance with the Act during the four-yearly Electronic Use Survey.

Management and Steering committees were convened in 2004. Appreciating the importance of including a diversity of stakeholders in the project, committee members were drawn from across the University, including representatives from the University Chancellery, Student Services, the Legal Services Office, the Student Guild, Faculties, and the Library. The project was implemented according to the Library's project management methodology PRINCE2 (Projects in a Controlled Environment 2).

Seven objectives were agreed to:

1. Provide UWA staff and students with access to learning materials via an online interface, which is available 24/7, from any computer connected to the Internet, in an organised and relevant manner.
2. To facilitate some degree of self-submission and self-management of online learning materials used by an academic unit by the academic staff directly involved.
3. To integrate online learning materials offered via the LRS with the University's preferred LMS i.e. WebCT.
4. To facilitate the rights management of learning materials.
5. To improve the management of materials copied by the University under the provisions of the Copyright Act (1968) and Copyright Amendment (Digital Agenda) Act 2000, to ensure compliance and facilitate reporting to the Copyright Agency Ltd.

6. Migrate relevant material and metadata from the University Library's collection into the LRS, including Course Materials Online and the online Examination Papers.
7. To identify associated issues which may need to be addressed by the Teaching and Learning Committee such as training, ongoing support and management issues.

Again drawing upon staff from across the University, a User Advisory Group (UAG) was convened to refine and expand the user's functional requirements for the system. This work was based upon requirements developed by an earlier Library project and was used to develop a Request for Proposal, which was issued to seven software vendors in December 2004. Two Open Source products were also reviewed. The nine products were:

- Concord Australia Pty Ltd's Masterfile
- D-Space
- Endeavor Information Systems' ENCompass
- ExLibris' DigiTool
- FEDORA
- Harvest Road's Hive
- Intrallect's Intra Library
- The Learning Edge's The Learning Edge CMS
- WebCT's Vista

After a rigorous evaluation process including live demonstrations from two vendors, HarvestRoad Ltd's Hive product was selected.

HarvestRoad Hive

HarvestRoad is a software development company who, coincidentally, has its headquarters in Perth, Western Australia. HarvestRoad's focus is the management of content used in knowledge enterprises that implement online or flexible learning. HarvestRoad Hive is designed to manage content independently of an LMS, fostering true re-use of content across courses and improved information capture, management and utilisation through the implementation of several industry standards. UWA selected HarvestRoad Hive for the following key reasons:

- Its understanding of key international e-learning standards such as IMS Content Packaging and SCORM 1.2.
- The flexible use of metadata. While the system comes "out of the box" with many common metadata schemas such as Dublin Core, IMS and SCORM, Hive also allows you to modify an existing schema or define your own.
- The flexibility to repurpose content. An object stored in the Hive repository can be published as either publicly available or secure, linked to from any Web site, or linked to from an LMS such as WebCT.
- Hive came with an Advanced Copyright Engine (ACE) which not only understood some of the limitations of the Australian Copyright Act, but could also assist staff enforce these limits through automated checks.

The University was confident that Hive could provide solutions to all but one of the key areas. The area where HarvestRoad lacked an out-of-the-box solution was the provision of the Resource List Management System. In fact, none of the nine solutions could deliver a product which adequately met our requirements for an RLMS.

Development of the Resource List Management System

In December 2005 UWA entered into an agreement with HarvestRoad to develop a Resource List Management System to sit atop their Hive digital repository. In broad terms the RLMS would enable students to browse or search for their unit's single, consolidated list of course material, whether the items were electronic or located in the Library's physical collection; sort the list into different orders; jump from the list to electronic copies of the object; and access their list of course material from WebCT, without having to log in again.

Teaching staff would be able to submit digital material into the repository themselves, or request the Library do so on their behalf; manage their unit reading lists, setting when items should appear and disappear from the list; determine the order in which citations should appear; group citations into unit-relevant categories; and add a note to each citation to direct the student in the item's use or worth.

An item could be added to the repository and hence a reading list in a number of ways:

1. Teaching staff could submit a "CMO Request" to the Library via an online form, akin to making a document delivery request.
2. A digital item could be attached to the "CMO Request" by the lecturer, for the Library to review before publishing.
3. Teaching staff could search the Library catalogue from within the RLMS via the z39.50 protocol to locate a bibliographic record for an item, and pull across a brief bibliographic record.

Development of the RLMS software started in October 2005, and coding began in earnest once the agreement had been signed in December. Ideas were exchanged via email, phone conversations, and in person. HTML prototypes were developed by both HarvestRoad and UWA staff. HarvestRoad also mounted beta versions of the system on one of their servers, which allowed the UWA team to critique a working prototype.

The first version of the RLMS software (1.0) was delivered on schedule on the 16 January 2006 and included the bulk of the proposed functionality. Due to the tight deadline some functions were scheduled for delivery in release 1.1, which arrived one month later on 16 February (RLMS 1.1.6). This release also addressed a few small issues noted by staff where the software wasn't performing as expected.

Migration from Old CMO to New CMO

HarvestRoad also delivered a modified version of their Hive Explorer application. Hive Explorer is a Java-based graphical interface which allows a drag-and-drop interaction with the repository, although it offers only a subset of the Web interface's features. Hive Explorer would be used to migrate the Library's existing collection of digital course material into the repository. UWA Library IT staff built a Perl script which extracted bibliographic metadata for each item from the Library catalogue, and validated this data against local standards. The data was saved as

an XML file formatted into the metadata schema selected for the RLMS. One staff member was then able to drag the course material into the repository using Hive Explorer, triggering the automatic creation and linking of a Hive record, a metadata record, and where appropriate a copyright record. 5,773 past examination papers in PDF, 8,084 scanned journal articles and book chapters in PDF, and 5,250 HTML documents representing links to online journal articles and Web sites, were imported into the LRS repository over three days.

While the migration of course material and metadata from the Library catalogue to the LRS was performed with little manual intervention, three issues are worth noting:

- Approximately 1,100 or 5% of the catalogue records failed the data validation checks built into the migration scripts. Library staff reviewed and corrected each of these records before the migration was performed.
- Australian copyright law allows you to publish only one “part” of a literary work online across the entire institution at any one time. If a teaching unit was permitted to copy three chapters from a book, they would need to combine them into one file to publish online. In the previous system the practice was to create three bibliographic records in the Library catalogue to describe each chapter individually, but link to the same file from each record’s 856 MARC field. The Hive repository allows only one metadata record to be associated with each object. The combined chapters were published into Hive as one file, and associated with the metadata which described only the first chapter. Library staff manually reviewed each of these cases to determine whether the repository’s record needed to be expanded to describe all chapters within the file, or whether the file should be “exploded” to publish only one chapter and exclude the rest.
- The third issue to note concerned the bibliographic description of free Web sites. The catalogue records for such sites were usually much briefer than those describing a scanned book chapter or online journal article. These records also often failed the data validation standards during the migration. Many were not brought across to the new system.

Once the objects had been migrated into the repository, they needed to be reassembled into “reading lists”, as these were not migrated from the catalogue. Library staff manually collated citations into approximately 700 lists using the RLMS’ editing functions. Library staff also added citations for several thousand items held in the Library’s physical collection. This work is described in the section titled “Temporary CMO Unit”.

User Management

Materials copied under the provisions of the Australian Copyright Act can only be distributed to current staff and students of the University. Controlling access to these items was therefore an important factor when selecting a repository. HarvestRoad Hive offers multiple levels of access control; restricting users to specific “bureaus” within the repository, specifying user permissions on a category of objects, or specifying permissions on the individual objects themselves. Using the HarvestRoad Hive LDAP adaptor (HLDAP), user data was extracted from the Library’s LDAP-compliant user directory to create over 26,000 individual user records in Hive. A minimum of data was extracted; just the user’s name and email address. User records are updated in Hive on a nightly basis.

Each user was enrolled in one or more “roles” to impart the user with the relevant permissions. Initially all users were classified as “students”, giving University staff and students read-only access to the system.

Launch and Rapid Evolution of the RLMS

The new Course Materials Online was re-launched to the Library’s readers on schedule on Monday 27 February 2006, the first day of Semester 1. It was well received by both staff and students alike, who appreciated its easy-to-use interface.

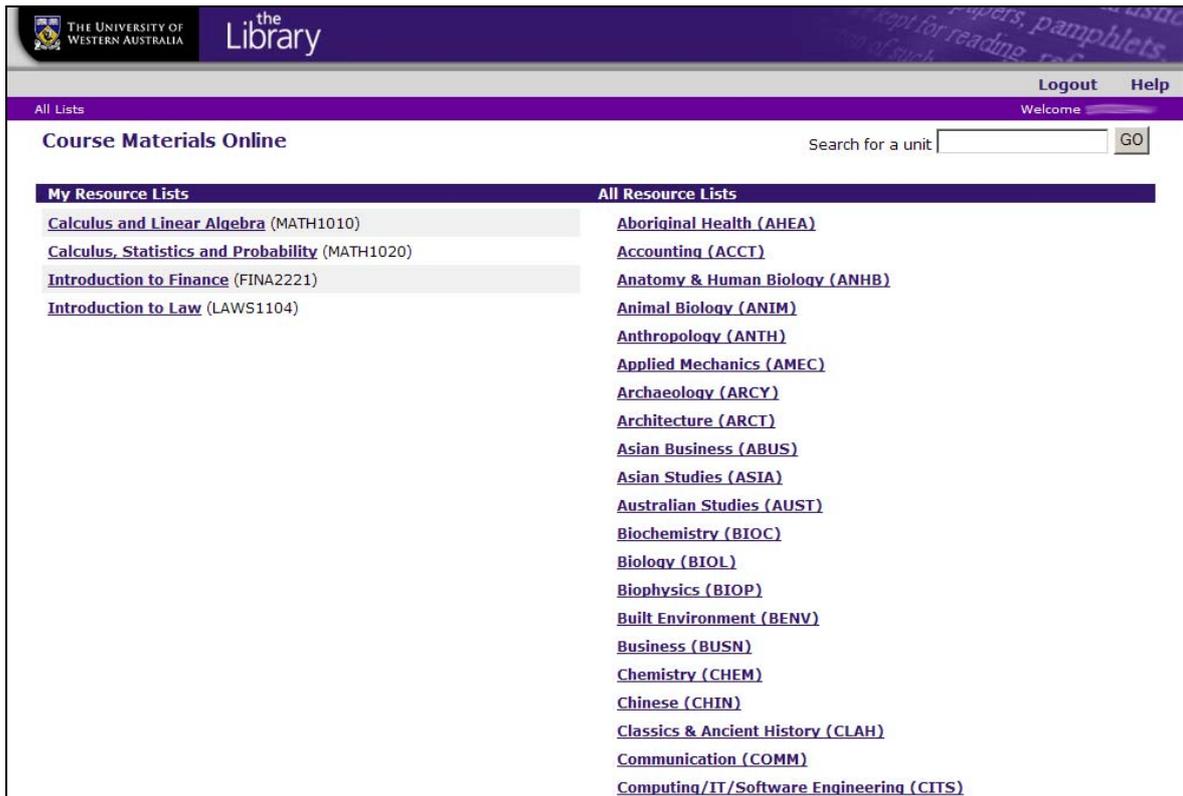


FIGURE 1: Browsing Course Materials Online

The screenshot shows the UWA Library's Course Materials Online (CMO) interface. At the top, there is a navigation bar with 'Logout' and 'Help' links, and a welcome message 'Welcome 10530144'. Below this, the unit title 'Introduction to Law (LAWS1104)' is displayed. There are filters for 'Group by' (set to 'All') and 'Sort by' (set to 'Title' and 'Ascending'). The main content area is titled 'Course Materials' and contains a list of resources, each with a magnifying glass icon and a document icon. The resources listed are:

- Acceptance in the sale of goods (Brown, Ian . In: The journal of business law [Course Materials])
- Acts Interpretation Act 1901 (Cth) (Australia [Course Materials])
- An introduction to the law : (in Western Australia and other common law jurisdictions) (Gould, Lloyd R. [2004] [Course Materials])
- An introduction to the law of contract (Graw, Stephen. [2002] [Course Materials])
- An introduction to the law of contract (Graw, Stephen. [2005] [Course Materials])
- An introduction to the law of contract (Graw, Stephen [1998] [Course Materials])
- Andrew Shelton & Co Pty Ltd v Alpha Healthcare Ltd [2002] VSC 248 (No author specified. In: Unreported judgments [Course Materials])

FIGURE 2: A resource list in CMO

One consistent criticism of the new software was the speed at which it displayed long reading lists. Lists with 150 items would take over one and a half minutes to load. The implementation of a citation cache in the server's memory reduced the load time to just a few seconds for even the lengthiest reading list.

A key objective of the UWA Library's Strategic Plan 2005-2007 is to provide interfaces which make it easier for users to find relevant information. It was realised that the Course Materials Online interface could be tailored for each user when they logged in, displaying shortcuts to the lists for units they were enrolled in (see "My Resource Lists" in Figure 1). This required the creation of additional "roles" within HLDAP which captured the cadre of students enrolled in each unit. The RLMS was modified to identify whether a CMO list existed for each of these units, and if so to display a link to it from the opening screen. This modified interface was released to students in RLMS version 1.2.11 on 2 June 2006.

It should be pointed out that CMO encourages students to browse to or search for their reading lists, but it does not offer students the ability to search for individual items linked to a list. This behaviour stems from a deliberate decision made by the Library to suppress the CMO bibliographic records when they resided in the Library catalogue. It was thought the appearance of records describing journal articles within the catalogue's search results would confuse students who had been taught the catalogue only contained records for journal issues. This decision was later ratified by a recommendation from the LRS User Advisory Group not to implement a comprehensive search engine in the new CMO. Students would be able to search for lists, but would only locate items by browsing to lists where the items would be displayed within a contextual framework. Students would continue to be encouraged to locate their own information resources via indexing databases.

Whether students would benefit from a comprehensive search engine across CMO content is a contentious issue, and the decision will be reviewed in the near future.

Management of Lists by Academic Staff

Up to this point, the implementation of the RLMS atop of Hive had delivered an online repository of course readings and an interface through which students could access them. Students had benefited from an interface which was slicker and more user-friendly than that of the Library catalogue. Library staff had benefited from a modern, standards-compliant repository which facilitated the management of each digital object and its copyright metadata. Despite these changes, academic staff had not changed the way they interacted with Course Materials Online.

In June 2006 HLDAP was again modified to identify certain types of UWA staff. This information was used to populate the “RLMS Academic” role within Hive. Membership of this role imparted the user with editing rights, allowing them to update the information contained on each list, including the citations displayed. For the first time, academic staff could log into the RLMS and update their unit’s CMO list without any intervention required by Library staff (see Figure 3). While a guide has been produced to assist staff, and an announcement made via a number of email lists, promotion of this new service has been kept low-key while the system is “bedded down”. Fourteen academic and general staff outside the Library have used the RLMS’ editor functions during the two months following their release. More promotion is planned to ensure this figure grows.



FIGURE 3: Editing citations on a CMO list

Integration with Online Learning Environments

Another shortcoming of the catalogue-based Course Materials Online system was its inability to integrate with an online learning environment such as WebCT. The Library catalogue did not allow a stable URL to be created which linked to a unit list, forcing students to jump out of WebCT to search for their unit's Course Record in the Library catalogue. This was far from ideal in the "click-and-get" world of the "Google generation."

UWA believed that the RLMS must integrate with the University's online learning activities, and therefore integrate with WebCT. If the link between WebCT and the unit's reading list in CMO was seamless, teaching staff could manage their course readings in a central location - the RLMS - and re-use it elsewhere without duplicating the content.

An advantage of selecting a repository such as HarvestRoad Hive which also understood the requirements of a "learning content management system" was the mechanisms it offered for integration with an LMS. Using WebCT's "PowerLink" architecture, HarvestRoad have created a function which allows a WebCT author to easily create a link from a WebCT course directly to a unit's CMO list in Hive. The PowerLink handles the user's authentication into CMO. From the point of view of the student, access is seamless and they are not challenged to log in again.

These benefits also apply to learning materials not managed by the Library. A learning content management system allows any academic content to be stored once in a central repository, and separate from the LMS. This allows the content to be reused in any number of courses, across any standards-compliant LMS. Not only does this offer the University economies of scale, but it also to some degree "future-proofs" the investment made in the creation of these teaching materials, as the content is not inextricably linked to a proprietary LMS. The University is undertaking two pilots to investigate the practicalities of using the Hive repository to store other learning materials.

Reviewing the Organisational Model

The implementation of the LRS and the RLMS presented the Library with the opportunity to review the workflows and activities associated with the delivery of Course Materials Online (CMO) and Examination Papers Online (EPO) with the possibility of putting in place a new organisational model to meet the needs of the Library now and in the future. In addition, a group of staff was required as soon as possible to set up and manage the new system in time for the launch at the beginning of Semester 1, 2006. It was decided to manage the implementation of the new model as a project that would build the foundations for the ongoing management and governance of the two services.

It was intended that the project would improve these services to readers to ensure that the Library provided an efficient, flexible and responsive service. This would be achieved by reducing the turnaround time for production of new items, providing a single access point for end-users of the services and implementing an operational model which would best suit the new system and the needs of the Library.

The previous model had largely been a decentralised one with a number of Library sections involved in processing CMO items. It was felt that centralising as much of

the process as possible into a “CMO Unit” would bring about efficiencies and decrease the overall turnaround time for publishing an item.

Temporary “CMO Unit”

In order to determine whether the centralisation processing would bring about these efficiencies, the Library set up a temporary “CMO Unit” in January 2006. This Unit was managed part-time by the Project Manager (HEW9) and made up of two team leaders (HEW5) and six library officers (HEW3), drawn from a number of sections within the Library following an internal expression of interest. These staff were not initially backfilled in their respective sections as the amount of CMO work in these sections was significantly reduced.

The staff in the Unit had the task of creating the lists in the RLMS, populating the lists with items from the Library catalogue and the Hive repository, and the processing of new items required for Semester 1, 2006. There was a tight time-frame for this task, as work could not commence until after the migration had occurred, leaving project staff approximately three weeks to prepare the system for the start of semester. The RLMS was still being developed by HarvestRoad which caused some delays and impacted on the amount of work completed for the beginning of semester. For example the “CMO Request” function, used by academic and Library staff to request the digitisation of new items, was not yet ready and thus a more manual and time consuming work around was required.

By the start of semester in February, approximately 700 unit lists had been created and populated with items and approximately 450 new items had been requested by academic staff and processed by the project staff. Initially there was very little improvement in turnaround time for items and additional staff were allocated to the project to clear a processing backlog which had built up while procedures were being developed. After the procedures were streamlined and the speed of the system improved the turnaround time decreased. By the end of April 2006, 2047 new items had been requested and processed for CMO, turnaround times had significantly improved, and the number of staff working on the project was reduced.

A New Ongoing Operational Model

In late March work began on planning the ongoing operational model required for the service. Centralisation of the CMO workflow had decreased turnaround time and it was felt that this should be the focus in the ongoing model. It was proposed that a “Digital Repositories Unit” be established within the Information Resources Access Management (IRAM) section of the Library. The central unit would provide overall coordination of the service, including training for staff, communicating with academic staff and the promotion of the CMO service. However it was felt that a role for subject libraries should remain in this model (albeit a reduced one) as staff based in these libraries were best placed to liaise with academic staff on issues relating to support and training, and processing items for physical reserve including adding items to lists in the RLMS.

In addition to coordinating CMO and EPO, it was proposed that the Digital Repositories Unit would also be responsible for other LRS digital collections, digital theses and other digital repositories as they arose.

The next task was to decide the number and level of staff required. It was agreed that a coordinator was needed to manage all activities relating to the Library's digital repositories. This position would direct the operations of the Digital Repositories Unit and act as a central point of contact, both within the Library and

the wider University. As this role required the ability to accommodate a range of interests, develop policy and procedure, resolve complex problems and provide strong coordination of digital services, it was decided that a HEW7 level position was required for this role.

Based on item processing time and the number of new requests made it was determined that 3FTE staff were required for processing new course materials and examination papers. As these staff would create metadata following strict cataloguing standards and copyright principles, construct stable URLs, and carry out advanced problem solving it was felt that they should be at HEW4 level.

In May all the ongoing positions were advertised and the Digital Repositories Unit was fully operational by July. All positions were funded from within existing resources freed up by the centralisation of the service.

One of the key outcomes of the project was an improved turnaround time for the processing of new items. It was estimated that it took six weeks on average for an item to be published via the previous model. This improved during the project, and again subsequently once the ongoing operational unit was implemented. From 28 July to 7 September 2006, 409 new items for CMO were published with a median turnaround time of just 2 days (an average of 3.4 days, with the quickest less than a day, the longest being 45 days).

Future Directions

With the implementation of the RLMS and roll-out of self-management to academic staff, the LRS project has satisfied all of the Library's immediate goals. However, there is still progress to be made on several fronts.

While self-management is available to all academic staff, many are not aware of this service or of its benefit to them. More promotion will be undertaken for the 2007 academic year.

The development of the RLMS will continue. Already the UWA Library is negotiating with HarvestRoad on the implementation of several new features and enhancements to existing features.

The Library is also participating in two pilot projects within the LRS project to implement the use of the LRS in the everyday teaching activities of academic units. A trial with the Graduate Entry Medical Program in the Faculty of Medicine, Dentistry and Health Sciences (FMDHS) will see content migrated out of WebCT into the LRS and linked to from the WebCT course. The Library is also conducting a similar pilot in-house, migrating the content for its information literacy classes into WebCT.

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