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**Access and Management of Library Materials in a Digital World: a review of the systems
used by the University of New Mexico University Libraries**

Introduction

Over the past twenty years technology has taken great strides in how it is used in everyday life. Walk into any school, university or business and you are bound to find a large amount of work, and in some cases all, being done on computers. But technological advancements are not the only reason for an increase in the use of electronic resources, the continual expansion of the Internet has also provided many users with what appears to be an endless amount of information that they can access anywhere there is a computer and an internet connection. Of course, the large amount of information available does not always equal reliable information.

Putting aside the argument about the quality of information verses the quantity of information found on the Internet, the ability to access information electronically has made a huge impact on how libraries provide resources and the format in which library materials are now found. The following review takes a look at the systems currently in use at the University of New Mexico University Libraries and how they are being used to provide staff and patron access to various forms of electronic resources. Adding to this review is a comparison of how the same systems are being used by other academic libraries, which may help to provide a basis for how libraries are tackling the ever expanding concern of how to provide access to information.

The University and its Systems

The University of New Mexico University Libraries consist of four branches including, Zimmerman Library, Fine Arts and Design Library, Centennial Science & Engineering Library and Parish Memorial Library. Within these four branches there are currently over 450 computers available for patron and staff use and 7 servers that are used in conjunction with library systems

and software. The University of New Mexico University Libraries also subscribes to almost 17,000 electronic journals and over 130,000 electronic books. Additionally, the University Libraries also offer an online catalog, electronic reserves, interlibrary loan, digital archives and access to multiple databases through their website. All of these services are accessed and maintained through the libraries' choice of systems and services.

Unfortunately a comprehensive list and comparison of all of the systems used within the University of New Mexico University Libraries is too large to fit within this one short review; instead this paper attempts to look at some of the major systems that are used by the University Libraries. The systems that are covered include Millennium, Gold Rush, LOCKSS, DSpace, CONTENTdm, Docutek ERes and ILLiad. All of these systems are used by both the librarians and patrons at the University Libraries, however the manner in which the systems work together appears different when looking at their internal, or library, side verses their external, or public, side.

System Descriptions and Comparison

Before going into detail about the types of systems used by the University of New Mexico University Libraries, it is important to note how all of them fit into fulfilling the service needs of the university. The seven systems listed above make up part of the University of New Mexico's digital library, which serves all of the libraries on main campus, as well as some of the regional campuses of UNM. But what exactly is a digital library?

Chowdhury (2002) looks in detail about the different definitions of a digital library, however for the purposes of this review, the digital library includes not only the information available online, including text, videos and sound, but also the tools or systems used to maintain the information and make it accessible for use, in essence the entire online services of the

University of New Mexico University Libraries, from the catalog to the journal articles found within a database.

Two other terms that are also important to note are the ILS and the ERM. The ILS, or integrated library system, is used to track everything from bills paid to items checked out, which includes providing the internal and external faces of the library catalog, often referred to as the OPAC. In addition to the ILS which offers the OPAC to catalog print materials and other library holdings, the ERM, or electronic resource management, system is used to manage electronic resources, including databases and journals. In 2004 the Digital Library Federation (DLF) published a report on the changing needs of libraries in conjunction with the increase in electronic resources. The DLF report provided a list of requirements that should be met by all ERMs and are based on a set of guiding principles which includes providing both management and access to electronic resources, the capacity for global updating and the ability to support interoperability and data sharing with existing OPACs, Web portals, library-management systems, and link resolution services (Digital Library Federation, 2004). Moving from these definitions it is possible to look in more detail at the types of ILS and ERM systems that are in use within the University Libraries.

Perhaps the most important and widely used system within the University of New Mexico University Libraries is Innovative Interfaces Inc's Millennium. Innovative's Millennium is an ILS that was created specifically for libraries and is one of the most popular integrated library systems used across the world. Millennium itself contains many modules, including Acquisitions, Cataloging, Serials, and Circulation, all of which are utilized by the University Libraries. Looking at each module individually, it is easy to see how each one functions within the library.

Beginning with acquisitions, we can see that the main functions of this module include ordering, receiving, and invoicing materials within Millennium. Acquisitions also enable the ability to search OCLC Connexion and bring in records to Millennium for bibliographic record and order record. As an offshoot to acquisitions, University Libraries also has staff that utilizes Millennium Paying and is responsible for approving payments for all materials ordered for the University of New Mexico University Libraries, including books, subscriptions, standing orders, electronic resources and approvals. Title changes, cancellations, cessations and invoice problems are also handled by this team, with the information being entered and tracked through Millennium.

The next module of Millennium is cataloging. Cataloging involves classifying and indexing materials with records first being entered into OCLC WorldCat and then downloaded into Millennium. The ability to download records from OCLC WorldCat is a highly useful function as it avoids unnecessary duplication of records that have already been entered, instead allowing for the addition of downloaded records directly into the OPAC.

The third module of Millennium is serials. Serials enables the library to format and process unlimited serials, tracking magazine and newspaper holdings. The serials module can also be used to keep track of volumes that have been sent to be bound, updating the records to show the change in the status of the volumes location and, once the bound journals have been returned, to change the status of the volumes into one condensed check-in box to reflect the changes in how the journals are now physically displayed (Shontz, 2002, p.217-218). This module is also very useful in listing what years there are for print journals and notes what journals may have been changed to electronic format. Millennium also has an ERM module that was developed in 2002-2004 and was designed to help incorporate electronic resource

management into the existing integrated library system (Grover & Fons, 2004). At this time the University of New Mexico University Libraries does not use this function of Millennium and instead incorporates another ERM, Gold Rush, which will be covered shortly.

The final and perhaps the most important function of Millennium, at least for the patrons, is the circulation module. Circulation involves all of the following functions: Check out, On-the-fly check out, Check in, Renewals, Patron blocks, Holds, Recalls, Lost and claimed-returned processing, Fines, and Overdue notices and bills. Circulation is also one of the modules that patrons are able to view within the public interface of Millennium. When patrons go online and access LIBROS, UNM's OPAC, they are able to see the status of items and their location, as well as being able to view their own library record which displays fines or holds on materials.

Overall the major benefit of Millennium is that it was created for use in libraries, it is not a system that had to be adapted from corporate origins. Also, since all of the different features were created by the same company as part of the same system, they all work together well, feeding information into the system in a usable manner. The popularity of Millennium is also a valuable addition as it allows for a greater amount of feedback to be given from libraries throughout the world that use the system. One drawback however is that despite the high number of universities, public libraries, consortia, etc. that use Millennium, there is not a large amount of literature that reviews the services, instead, Innovative Interfaces has a list of case studies available on their website that provides information about the universities or other institutions with excerpts as to why they chose Millennium or how it has helped them (Innovative Interfaces Inc, 2008b). Based on these case studies, it appears that the popularity of Millennium has to do with the ability to provide access to the OPAC for all different branches and campuses of university libraries, as well as providing offsite access. Additionally, the ability

to pull reports, maintain budget information and catalog materials are all important aspects for academic libraries, and the fact that Millennium allows all of these functions to be completed through one system is highly appreciated by many libraries, including Douglas College (Innovate Interfaces Inc, 2008a).

Moving away from Innovative's website, the research that has been done on Millennium deals mostly with the development of Innovative's ERM system, as previously noted. Concerns over the challenges for managing electronic resources have also been discussed in conferences, which representatives from Innovative Interfaces have attended in order to advise librarians on how their services will help quell some of these concerns (Loghry, 2004). Of course, the guidelines for what make a good electronic resource management system were also discussed in the conference, however these guidelines have already been noted from the 2004 DLF report. Looking more in depth at the 2004 report, the DLF ERM Initiative also provided a look at specific ERM systems including Gold Rush, which is the system currently in use by the University of New Mexico University Libraries.

Gold Rush is an electronic resource management system developed by the Colorado Alliance of Research Libraries, which includes eleven libraries throughout Colorado and Wyoming. Some of the features of this ERM include subscriptions management, OpenURL link resolution, public search interface and content comparison, and it boasts interoperability with any ILS. Gold Rush was originally created to serve the members of the Colorado Alliance of Research Libraries, before being made available to other libraries in 2003. The University of New Mexico University Libraries uses Gold Rush to manage their electronic journals and uses the four applications, Reports, Holdings, Subscriptions, and Cataloging that make up the internal side of Gold Rush. Within these four applications, Gold Rush enables the library to keep track

of licenses, which journals are provided through different databases, which journals are full text and the URLs associated with the journals and databases, as well as a number of other functions. The Holdings section of Gold Rush is particularly useful within the University Libraries as it enables easier changes when adding and removing databases or changing the URLs for electronic journals. Views of how each application can be utilized and the types of information and reports that can be pulled are available at the Gold Rush website (<http://grweb.coalliance.org>). This documentation can help new users of the system from both the internal and external side as screen shots and written instructions are included for both.

Once again stepping away from the documentation that is available directly from the vendor's Website, the literature on Gold Rush focuses on the goals of the service as a way to help libraries centralize their electronic journal subscriptions, while helping patrons find the appropriate journal or link to an article that they may have had difficulty finding in the past. The original public interface of Gold Rush allowed patrons to search by different indexes, including title, keyword, subject heading, and ISSN to name a few, while also allowing for the addition of limiting the results to full-text journals (Stockton & Machovec, 2001, p. 57). The current version of Gold Rush also boasts anOpenURL linker, called Gold Rush Linker, that provides links to find the full-text of the appropriate article results that may be available outside of the library databases, such as on the publisher's Website or on an aggregator's site (Machovec & Stockton, 2004). This is an important feature as studies have shown that patrons often prefer to use databases and services that provide full-text (Coombs, 2005).

As Gold Rush is focused on e-journals, it can help libraries verify if a journal is available through more than one database and if they are paying double for the same journal, however it does not reference the University of New Mexico University Libraries' print holdings for

journals, which overlooks the issue of duplication between the print version and electronic version of a journal. This is potentially problematic as money is being spent on multiple formats for the same journal, which may not be necessary. Besides duplicating print, there is also the issue of preserving digital materials. Most patrons do not know about licensing agreements and perpetual access to journals, they only want to be sure that they can access the same journal article from 1999 that they found previously. That is why the use of LOCKSS is important.

LOCKSS (Lots of Copies Keep Stuff Safe) is an open source, peer-to-peer, digital archive that provides tools and support so that libraries can “maintain local control over the content they have purchased just as in the print model” (Fox, 2007, p.23). The design of LOCKSS is meant to allow content from any Internet accessible resource be added to the LOCKSS repository. LOCKSS also allows for digital copies of journals and other born digital materials to be housed long-term, in their original formats, which can then be migrated to other formats if needed. Additionally, if a vendor site were to go down, as long as the resources were archived in LOCKSS, the library would not lose access to the information.

The popularity of LOCKSS can be seen in the hundreds of libraries that are currently using the archive and the trust that has been built between them. As the service is peer-to-peer, having a large number of libraries providing access to the content results in a greater chance that a good copy of the resource archived will remain available and be usable in the future. Seadle (2006) notes that one of the major benefits of LOCKSS is the social element of having so many different libraries providing the resources that are being archived, and that LOCKSS system is a tried and tested example of a successful digital archive. .

While on the issue of archives and continued access to materials, we are brought to the next two systems used by the University of New Mexico University Libraries, DSpace and

CONTENTdm. DSpace was designed by MIT and Hewlett Packard as a “digital repository to manage the intellectual output of multidisciplinary research and development organizations” (Laxminarsaiah & Rajgoli, 2007, p. 281). DSpace can be crawled by Google, thus increasing the capability of users to locate articles or papers that may not have been published or are part of a professor’s collection. In comparison to other content management systems, including Greenstone and Fedora, DSpace has a high quality of preservation and conservation of original documents (Han, 2004; Laxminarsaiah & Rajgoli, 2007).

Within the University of New Mexico University Libraries, DSpaceUNM is used as a digital archive for the University of New Mexico's research and creative works. The goal of the University Libraries is to have all of the literature created at the University of New Mexico, such as faculty work and articles and student theses, be added to the repository. One current drawback however is that, while some professors have embraced DSpaceUNM and have put a large portion of their work on it, there are still a large number of users and professors who do not know about this useful service.

Just as with Millennium and Gold Rush, DSpace has a large amount of documentation about using and maintaining the system. DSpace also has a wiki dedicated to providing more information about the libraries that use DSpace, any projects that may be going on that are using the system, as well as any updates or news about DSpace and can be found at <http://wiki.dspace.org/index.php/DspaceInstances>. Using the DSpace wiki to locate some of the other libraries that use the system, it was found that the majority of universities that are similar in size to UNM have about the same number of items within their DSpace services. It seems that the overall use of DSpace is dependent on if the university or college has a particular project or use for the system and how DSpace is advertised.

While DSpace may have difficulty attracting the upload of resources, CONTENTdm is a system that has seen great success with the creation of digital collections. CONTENTdm is a digital collection management package supplied by DiMeMa and OCLC that allows libraries to post a variety of media types, from documents, newspapers, photographs and maps to audio and video files. The primary uses of such a service are often preservation or increased access to materials, with the University of New Mexico University Libraries falling within the latter category.

Hosted at the University of New Mexico the University Libraries use of CONTENTdm has increased access to a number of special collections within UNM and throughout New Mexico. Funded by the Center for Regional Studies and various grants, the University of New Mexico University Libraries has used CONTENTdm to create metadata and digital collections of a selection of items, including pictures, books, posters, oral histories, maps and digital films. But the creation of digital collections is not limited to UNM collections; the system has also been used to add collections to the Rocky Mountain Online Archive (RMOA) which contains information about archival collections in Colorado, New Mexico and Wyoming. Twenty institutions participate in the RMOA, thus expanding access to their collections while helping researchers and educators discover more source materials that may be relevant to their studies.

In comparison to the use of CONTENTdm at the University of New Mexico University Libraries, other universities are also showing success with the implementation of CONTENTdm within special collections. Two such projects involve the World Civilizations Image Repository and the Mountain West Digital Library (Bond, 2004; Arlitsch & Jonsson, 2005). Both of these projects involved the creation of metadata and special collections using CONTENTdm, which were then made available online. The projects also show the willingness of different libraries,

institutions or college departments to collaborate to create and maintain successful collections. This once again reflects the success of the University of New Mexico University Libraries and the RMOA.

Moving away from the archival side of electronic resources, the final two systems that will be reviewed focus instead on changes in providing electronic resources in place of paper resources. The first of these two systems is Docutek ERes.

Docutek ERes is a popular electronic reserves system that is used by over 400 libraries worldwide. Docutek ERes allows libraries to make their course reserves available online, enabling patrons to have 24-7 access to reserve materials. Some of the advantages of Docutek ERes include ease of use and document level or course-level passwords which help control access to copyrighted materials. Of course as access to each class is through a password protected area and they are being used for educational purposes, most fall under fair use.

Prior to the implementation of ERes, professors at the University of New Mexico would take the articles or notes they wanted to place on reserve to the library branch of their choice and students would have to go to that branch to check out the folders for two hours at a time. This resulted in problems with folders not being returned with all of the notes included or pages being destroyed by multiple uses. In the Fall of 2003 the University of New Mexico University Libraries began using Docutek ERes to provide PDF, PowerPoint, Word and Excel documents that professors put on reserve for their classes. EReserves could now be located online through different search terms, including course number, course name, department, instructor or section number. By Fall 2007 there were over 800 classes that had items in ERes with over 1.3 million document downloads being completed in the last calendar year.

The positives for using electronic reserves includes less staff time needed to add reserves, as professors have access to add them online on their own, and the staff no longer need to check items in and out for students. There is also no limit to the number of people accessing the electronic reserves, unlike paper reserves which have a finite number of copies. Additionally, Docutek ERes also provides the opportunity for statistics to be pulled within the system to show how many downloads have been done over a particular time period, including hourly.

In comparison to the uses of Docutek ERes at the University of New Mexico, studies done on the implementation of the system within other libraries show that most librarians continue to control access to adding documents and files to the Docutek ERes system, while UNM allows professors to add the reserves themselves (Bombeld & Pfohl, 2004; Burgos-Mira, 2007). Additionally, the ability to add different types of file formats within the eReserves system at the University of New Mexico University Libraries appears to be a unique feature. Randall Library at UNCW and Hofstra University both restrict the format of the documents within their eReserves system to PDF files only (Bombeld & Pfohl, 2004; Burgos-Mira, 2007).

Despite the differences in who has access to adding reserves and the format of the electronic reserves provided, there are similarities in the concerns of copyright. Most of these concerns can be easily sated as the use of password protection to access course reserves and the way in which the resources are used allow them to fall under Fair Use. But electronic reserves are not the only concern for items under copyright, interlibrary loans also deal with providing electronic access to materials.

The final system to be reviewed and the second one that originated from paper resources to now include both paper and electronic resources is the University Libraries answer to interlibrary loan service. As no library owns every book ever printed or has access to every

journal, interlibrary loans allow researchers and students to request and receive copies of books or articles that they would not be able to find if they were limited to their home libraries holdings. The University of New Mexico University Libraries utilizes ILLiad to process their interlibrary loan requests. ILLiad, the Interlibrary Loan Internet Accessible Database, is a “patron-initiated request tracking system” that is now sold and licensed by OCLC (Tonn, 2003).

Through ILLiad, all the necessary steps to process ILL requests are done so electronically. The patron simply logs into ILLiad online, for UNM students and staff this can be done through the UNMUL Website, and submits a request for a book or a journal article. In the case of books, the user can also use OCLC FirstSearch to find the needed bibliographic information which is then automatically populated into their ILL request. Books are often received within 2 – 3 business days of their original request being complete. In the case of journal articles, the user is notified via email that their article has been received and they are able to access it online. This service is provided through Ariel which works with ILLiad.

Within the University Libraries the core users of ILL services are graduate students ($\approx 60\%$) and faculty ($\approx 25 - 30\%$). Comparatively, Tonn (2003) notes that the majority of request through ILL at Nicholls State University come from graduate students and faculty who use the service to complete research or degree programs. Tonn also notes that the majority of those surveyed would prefer to receive their requested items electronically when possible.

Overall the comparison as to how the University of New Mexico and Nicholls State University use ILLiad appears to show great similarities in who is using the service and why they are requesting interlibrary loans. It also shows that ILLiad is a successful ILL system that offers a faster turnaround time for requests, which is often the greatest concern of the user as they want to receive the materials as soon as possible, if not at that exact moment. In fact, if one were to

look at all of the systems used by the University of New Mexico University Libraries to provide access to electronic resources, it would appear that the ease and speed of the access, along with the accuracy of the resources, are the major concerns of the library as they are what the user wants most.

Interoperability information and Discussion

“There is ample evidence that when libraries make quality content available through the Web, its use increases and it reaches more people within the institution” (Association of Research Libraries, 2002). Electronic journals, online catalogs, databases, digital collections and even the Internet itself are all part of this quality electronic content. The ARL report reviewed numerous studies on information seeking behavior and the overall consensus appears to be that over 80% of incoming freshmen or new students in college use the Internet for research and homework (2002). It is this increase in the number of users and the desire to offer information of high quality and reliability that has lead many academic libraries to look at the equally important manner in which electronic resources can now be accessed and maintained.

While looking at the link between digital libraries and reference services, Chowdhury (2002) notes that the main reasons for the development and implementation of digital libraries are often to increase access to information, serve the needs of the patrons and to help organize electronic resources for ease of use. The systems used at the University of New Mexico University Libraries each have specific functions to support the library and provide access to electronic resources in one form or another. Millennium provides access to print materials and eBooks, allowing items to be cataloged and updated so that the most current and in depth information is available for the status of an item. Millennium also includes the OPAC, known as LIBROS, which displays a more limited record for the public view. Despite its limited view

however, the ability to access LIBROS online is a highly valuable service as it enables patrons to verify if books are available before even stepping into the library.

The use of Gold Rush to provide records of databases and journal information is also highly useful for the librarians to keep track of what subscriptions are valid and to ensure that there is no overlap with journal titles. In the public side, eJournal Finder allows patrons to search for journals by title, keyword, database title, ISSN and subject, and also connects with LIBROS, so that patrons who have searched the catalog for a journal can click on the link to bring them into eJournal Finder to search for electronic journals. Unfortunately there is no way to reverse this search with eJournal Finder linking to the print version of journals found through LIBROS.

Another area that could use further changes to improve interoperability deals with DSpaceUNM. While the system can be crawled by Google, there is no way for a patron to currently locate an article in DSpace without directly accessing the system online. If there was a way to connect DSpaceUNM with eJournal Finder or LIBROS, that would be highly beneficial for patrons who like a “one stop shop” with their searches. Of course, LIBROS only lists journal titles, not specific articles. Further research would need to be done on how it would be possible to link article searches with other existing systems.

Unlike Millennium and Gold Rush, ILLiad, ERes and the Digital collections all are independent from the other systems; however their specific qualities fit in having a separate access and search point from the OPAC or eJournal Finder. Adding eReserves to the OPAC would be difficult to maintain as class reserves change and it would limit who could add the information to librarians, restricting the speed in which reserves are made available and increases

the work time needed by librarians. In these instances, interoperability may work with some systems, but others are better left as they are, without creating overly complex situations.

Conclusion

Chowdhury (2002) notes that some of the reference services provided online are offered by non-library or commercial organizations to answer questions and provide information to users. A prime example of where users may go for a quick answer to a question is the ever popular Google search. Only having one small search box can make users feel that searching for answers to their questions are as easy as typing in a topic and clicking “Go.”

It is this supposed ease of use that libraries have to contend with when they are providing access to electronic resources. Website complexity and the public interfaces of library systems can affect how patrons utilize the library Website and the satisfaction they receive through this use. For the University of New Mexico University Libraries, the internal face of LOCKSS and the internal and external faces of Millennium, Gold Rush, DSpace, CONTENTdm, Docutek ERes and ILLiad must all be viewed as to their interoperability and the ease in which information can be found within one system verses another. Improvements must continually be made to ensure that all systems are working together to provide what appears to be seamless movement throughout the systems, ensuring that patrons are able to locate and utilize relevant electronic resources.

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