

Electronic Resource Management in Libraries: Research and Practice

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Chapter XIX

The Impact of Locally Developed Electronic Resource Management Systems

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ABSTRACT

As libraries dramatically increased their numbers of licensed electronic resources in the 1990s, such as online journals and databases, they realized the need for a record-keeping system that would help manage the details of acquiring and maintaining them. Since no off-the-shelf product existed, some libraries developed their own tools to manage electronic resources. This chapter discusses the development of locally designed electronic resource management systems; the process of developing the tools at several academic institutions is traced, with a focus on the aspects of the systems unique to each university. Locally developed electronic resource management systems have lead academic institutions to engage with other institutions and vendors building similar tools. As a result, community-wide efforts in identifying key elements for managing electronic resources have begun to emerge. These efforts lay the foundation for the future successful development of tools and standards to assist in electronic resource management.

INTRODUCTION

In the 1990s libraries began to see a dramatic increase in publication of and patron interest in electronic resources. Delivering materials to a user's computer desktop in digital form brought with it a multitude of considerations for providers of information in academic settings. Due to the

rapid acquisition of electronic resources libraries had to quickly create new workflows for technical processes such as managing and renewing license agreements and "processing" virtual products, as well as develop new communication structures and staffing workflows related to electronic resources (Gardner, 2001).

As libraries acquired an increased number of electronic resources, such as online journals and databases, they realized the pressing need for a recordkeeping system that would help manage the details of maintaining the resources. Since no off-the-shelf product existed, and traditional serials vendors did not provide management services for electronic resources, some libraries began developing their own tools to assist them in managing electronic resources.

In this chapter we will recount the impetus for the creation of several locally developed electronic resource management systems. The process of building such tools will be described in detail, as reported by the libraries that developed them (Cyzyk & Robertson, 2003; Farb & Riggio, 2002; Hennig, 2002; Loghry & Shannon, 2000). In addition to the creation of the management system itself, the administrative and staffing changes will be discussed, as evidenced in the literature (Duranceau & Hepfer, 2002; Gardner, 2001; Loghry & Shannon, 2000; Montgomery & Sparks, 2000).

As the idea of locally designed and built electronic resource management systems became more accepted, academic institutions began to seek assistance outside their universities to build their own systems. Examples of universities collaborating with other universities as well as commercial vendors and their impact on effective group management design will be presented (Chandler & Jewell, 2005; Digital Library Federation, 2004; Digital Library Federation, 2006; Dublin Core Metadata Initiative, 2006; Johns Hopkins University, 2004). The development of the individual management systems and the by-products of those systems, such as administrative metadata and the automatic exchange of serials data, will be noted (Chandler & Jewell, 2005; Jones, 2002). The process of developing these electronic resource management systems, and their eventual expansion, will be discussed as a possible model for organizing effective future library tools (Conger, 2004).

THE STATE OF LIBRARY ACQUISITIONS AS ELECTRONIC RESOURCES EMERGE

The delivery of electronic resources has transitioned from physical formats such as tapes, 3.5" floppy disks, and CD-ROMs (CD) and DVDs to remote databases and the currently common format of delivery via the Internet. Since large amounts of data could be stored on a CD, companies began to offer their proprietary resources in this format rather than in print or on earlier electronic formats such as floppy disks. The CDs acted as early databases, allowing users to "search" the CD for data. The CDs were either used at individual workstations or networked to allow for simultaneous searching by multiple patrons. The acquisitions department had to begin working more closely with their systems or technology department in order to ensure that the material delivered on CD was made appropriately available. In contrast with today's current expansive publishing on the Internet, relatively few publishers and vendors produced CD products, so the workflow paths that were initially developed were addressed at an ad hoc level.

As users grew comfortable with accessing content on their desktops rather than in print, publishers explored other options that would allow them to provide more frequent updates to their content, with quicker production times, and took advantage of an Internet-based format for delivery of materials. The move from CD- and remote database-delivered material to delivery via the Internet quickly gained popularity among library users; libraries nationwide cite a sudden and dramatic increase in purchases of electronic resources (Montgomery & Sparks, 2000, p. 13). In 2003 the Association of Research Libraries reported that in just ten years the average percentage of a member institution's total budget on electronic resources grew from 3.6% to 25% (Young & Kyrrillidou, 2004).

The issues surrounding the increase of publication of electronic journals were compounded for library staff, as no mechanism was in place for their management. The issues were diverse, with large issues such as deciding who had negotiating and signing authority for the license agreements required to lease the electronic content delivered over the Internet, to smaller issues such as figuring out how to organize large electronic journal packages and conceiving a mechanism to remind staff to renew electronic journal subscriptions so that patron access to the material was seamless and uninterrupted.

CHANGES IN STAFFING AS A RESULT OF LICENSE AGREEMENTS

As the steps for securing access to an electronic resource are complicated, so are the staffing needs. Whereas a print purchase requires action only within the acquisitions department, an electronic resource lease or purchase may require action both within and outside of the acquisitions department. Jewell notes that these new requirements mean that library staff are playing “new and important specialized roles” to ensure success in the acquisition of each electronic resource (Jewell & Mitchell, 2005, p. 139). In this new role, the acquisitions staff member maintains communication with other required parties during this negotiation process, keeping all stakeholders informed of the progress. After the purchase, the acquisitions staff member may contact the library’s systems department to verify access to the resource or to plan its maintenance. In this way, the acquisitions member acts as a liaison throughout the life of the resource in the library. Gardner’s 2001 survey identifies the following departments that may play a role in resolving a license agreement: acquisitions, the library director, collection development, the assistant director, and systems (Gardner, 2001).

The effect of electronic resources on other departments is also evident after the resource has been leased. In Duranceau and Hepfer’s informal survey reported in 2002 they note that “we find few, if any, ‘routine’ tasks related to digital resource management” (Duranceau & Hepfer, 2002, p. 317). Montgomery and Sparks note that a shift toward more electronic resources affects a variety of library departments and resources. Circulation/access services see a decreased need for reshelving and manual statistics gathering. Reserves are affected as students’ access materials electronically rather than in print. Information services are affected as seemingly fewer reference questions are asked; and the systems department is pressed for more assistance with infrastructure needs (Montgomery & Sparks, 2000).

CREATING LOCALLY DEVELOPED ELECTRONIC RESOURCE MANAGEMENT SYSTEMS

As library staff expressed a need for a mechanism for clear communication about the status of a license being negotiated, an active resource needing maintenance, or a report of funds spent, most libraries began a series of paper lists or worksheets to assist them (Kennedy, Crump, & Kiker, 2004; Loghry & Shannon, 2000). As the number of electronic resources grew it became clear that the paper lists could not be effectively shared among the staff needing access to them. Library staff needed a computer program that was designed to hold all the information related to an electronic resource so that it could be viewed from all the stakeholders’ computer desktops, yet no such software existed. Without an off-the-shelf program available to assist them in organizing their resources, many libraries turned to their own library or university staff for assistance in creating one.

Many universities attempted to create their own electronic resource management systems,

with varying degrees of success. Some created complete systems to manage many aspects of electronic resources processing at their libraries, while others focused their efforts just on specific aspects of managing the resources. Of the known electronic resource management systems and initiatives, three stand out as pioneers: Massachusetts Institute of Technology's VERA, Pennsylvania State University's ERLIC, and University of California Los Angeles's ERDb. There are other notable systems, such as Gold Rush, HERMES and the Tri-College Consortium's ERTS, which will also be discussed in detail.

Massachusetts Institute of Technology's VERA

The Massachusetts Institute of Technology (MIT) library launched VERA (Virtual Electronic Resource Access) in 2000. The program was developed to respond to two specific issues that had been identified at MIT: the library staff needed a centralized location in which to store information about eight aspects of license management, and the library needed an improved access point for patrons (Duranceau, 2000; Hennig, 2002). Until VERA was created, staff had to input information about licenses and access using a variety of tools; VERA gave them one centralized data tool. More importantly, MIT also wanted to improve user access to its licensed electronic resources; VERA was designed to make lists of its electronic titles easier to use.

The VERA program was created using FileMaker Pro software. MIT decided to use this database software because they had a site license for it and staff members were already familiar with its use (Hennig, 2002). Using a known software program to build the new system proved to be a smart decision because: (1) staff were likely to use VERA since they were familiar with its software; and (2) the developers could focus solely on the design of the tool instead of having to learn a software program and develop a new tool at the same time (Kennedy, 2004).

VERA was designed to be both a front-end and back-end system. The front-end, or patron view, allows searches by title, subject, keyword, or provider. The back-end, or staff view, allows staff to enter data into the Web-enabled version of FileMaker Pro. Since it is Web-based, staff outside of acquisitions can make changes to the title database from their own workstations without having to download software to their computers. The changes made are available to the public the following day, as the "working copy" of the program is uploaded each night to replace the existing live version (Hennig, 2002, p. 251).

Other than the ability to view text, patrons are presented with several icons with their search result (Massachusetts Institute of Technology Libraries, 2006). If the information is relevant to the search result, then the icon is displayed in the "More" field of the results screen. A legend of icons appears on the search results screen, assisting the patron to understand the access restrictions and permissions in a visual format. Staff activate the appropriate icons from the back-end view of VERA in order to display them to the public.

Pennsylvania State University's ERLIC

Pennsylvania State University's (PSU) Electronic Resources Licensing and Information Center (ERLIC) was constructed in 1999 as a way to track orders. The system was designed for acquisitions functions, and so the Microsoft Access-based program was initially populated with data related to acquisitions processes. In a 2000 conference presentation, Cochenour notes that though ERLIC was originally constructed in order to track and claim invoices for electronic resources it quickly grew to encompass information about license agreements and to share information about the resources (Cochenour, 2000).

ERLIC grew quickly once the stakeholders of the PSU electronic resources were identified. PSU identified the stakeholders as staff in the

following departments: acquisitions, cataloging, collection development, public service and systems. In order to meet the demands of these staff members ERLIC was designed to house information about funds and budgets, the status of orders and license agreements, and electronic resources access points. Microsoft Access was chosen as the development tool due to its relational database nature; views for different stakeholders could be customized to display only the elements relevant to that department. Cochenour commented in 2000 that the program had not spurred major changes in the daily workflows of the various stakeholders; this smooth incorporation of a system into the daily activities of a group is the result of considerate design based on a careful needs assessment that was conducted before beginning to build ERLIC (Cochenour, 2000). In 2001 the library added Cold Fusion Web pages to provide better license tracking and user authentication (Alan, 2002).

University of California Los Angeles's ERDb

The University of California Los Angeles's (UCLA) Electronic Resources Database (ERDb) was drawn from several working principles, the first of which is to "know your users" (Farb & Riggio, 2002). In designing their ERDb UCLA first developed a staff working group known as the Steering Committee on Access to Electronic Resources (SCAER) (University of California Los Angeles Library, 2006). The documents of this committee are freely available and include reports on its vision of the electronic resource management system, a list of contacts in each department that report to the SCAER, and a month by month timeline of steps to be completed in the development of the ERDb (available at <http://staff.library.ucla.edu/groups/scaer/>).

The architecture of the staff view of the system is constructed on Microsoft Access software, and is served to the public view through Cold Fusion (University of California Los Angeles Library,

2002). The ERDb has a staff view back-end and a patron view front-end. The back end has multiple fields for text entry and many pull down options for choosing keyword descriptors for a particular resource. A particularly useful feature of the ERDb is found on the troubleshooting screen, which houses problem reports for each resource. This trouble history tracks the problems of a resource over time and offers help in correcting a problem when similar issues occur (Farb & Riggio, 2002).

SOME SUCCESSFUL ELECTRONIC RESOURCE MANAGEMENT SYSTEMS, WITH A SPECIALIZED FOCUS

The electronic resource management systems discussed to this point focus on tools developed for a specific university setting. There are three additional locally developed systems that are notable for their successes in other areas. Gold Rush was locally developed and then made commercial, HERMES was locally developed and then made available as freeware, and the Tri-College Consortium's ERTS was created as a consortial management system; each will be briefly described.

Gold Rush

The Colorado Alliance of Research Libraries, a nonprofit group, developed the electronic resource management system called Gold Rush. It was created as a result of information gleaned from various academic institutions about what elements an ideal electronic resource management system would contain; from this information the stand-alone system was built (Collins, 2005). Stockton and Machovec note that the alliance hoped that by being constructed as a consortial tool Gold Rush would act as a "database of databases" (Stockton & Machovec, 2001, p. 53).

Gold Rush is a Web-driven system that is hosted remotely, so that libraries that use it do not have to download any software. It contains a variety of modules: subscription management, openURL link resolver, a public interface to allow A-Z searching, and a reporting feature for collection development assistance (Gold Rush, 2006). Of particular note is an email feature, which notifies a defined group of people when a license agreement will be coming due for renewal. This feature is customizable, with the ability to alert different groups of people for different resources, if desired. There are also several “views” available, giving each staff member access only to relevant modules of the system. Gold Rush does not integrate with a library’s catalog, though the data can be drawn out of or into the program to reduce double keying. The system is available for an annual licensing fee.

HERMES

The electronic resource management system, HERMES, was designed at Johns Hopkins University throughout 2000, and was built in 2001. It was developed in PostgreSQL and served through Cold Fusion (Jewell, 2005). It is constructed of modules, to which staff may be given access to few or many. The available modules are: authorization, selection, acquisitions, catalog interface, catalog, library computing services, public display, administrative search, report, scheduled notifications (Cyzyk & Robertson, 2003). Since the system is open source, another library may choose to add or delete modules to suit its needs.

An interesting feature of this system is the automated subject indexing. Based on a bibliographic record’s subject headings, the cataloging interface allows a mapping to HERMES’s subject schema. The cataloger enters the mapping for the first entry, and thereafter the system uses a look-up table to determine if the newly entered bibliographic record has a similar mapping structure; if it does it is automatically entered into the system.

The developers of HERMES defined particular roles, or groups, that would enter data into the system. These roles were identified in order to make certain that only necessary staff would be allowed access to the material. The roles include license management, budget management, purchasing, and cataloging, to name a few (Cyzyk & Robertson, 2003).

The Tri-College Consortium’s ERTS

The Tri-College Consortium developed their Electronic Resources Tracking System (ERTS) because the “paper files maintained by Serials Librarians have proven inadequate in both accessibility and organization” (Medeiros & Pascale, 2003). The Tri-College Consortium, made up of the libraries of Bryn Mawr, Haverford, and Swarthmore Colleges, shares many electronic resources, but paper files maintained at one college are not useful to the libraries of the remaining two schools. The design of this system, therefore, was planned to serve the consortium in managing the resources licensed by all three colleges.

The ERTS began construction in 2001 using FileMaker Pro and is shared with the other colleges in the consortium by the use of FileMaker’s sharing feature. The system contains a public view and a technical services view; the public view is made available through the Web. In addition, a design focus serves the function of generating reports that cannot be derived from the individual colleges’ integrated library systems. The reports available are: 60-day expiration alert, purchase type, pay date, expenditure comparison by purchase type, and acquisition count (Medeiros & Pascale, 2003).

The program is constructed of four modules: licensors, purchases, vendors, titles. Each college adds information to the modules, reusing existing data, if possible. For example, their stated intent of the licensing module is “to have one licensor record for all libraries that use that license, even if our terms differ slightly” (Medeiros & Pascale,

2003). Sharing this administrative metadata at the consortial level enables the three college libraries to have the same information if they need to contact technical support for a resource, request a new license agreement, or renegotiate a price upon renewal. The construction of a database with shared information reflects the efforts of three colleges that have gone to great lengths to accomplish this community effort. The consortium has constructed a suggested workflow for how to best handle licensing electronic resources in each library. The ERTS is available for download as shareware.

CHARACTERISTICS OF AN IDEAL ELECTRONIC RESOURCE MANAGEMENT SYSTEM

As locally developed electronic resource management systems cropped up across the academic library community it became evident that each served the needs of a particular institution, but was not necessarily effective in another setting. In evaluating the locally developed electronic resource management systems and the literature about them, authors attempted to identify the characteristics of an ideal system (Jewell, 2001; Jewell, 2005; Kennedy, 2004). In 2004 Kennedy suggested that the “dream” program would contain the following functions: notify appropriate staff before licenses expire, integrate with library management system to eliminate double keying, maintain current/appropriate vendor contact information, track funds used to purchase resources, eliminate paper shuffling from one office to another, track consortia purchases, update in real time, and produce ad hoc reports (Kennedy, 2004). The Digital Library Federation has since defined 47 requirements to construct a comprehensive system, and a Council on Library and Information Resources report lists nearly 150 functions or data elements (Jewell, 2001; Jewell, 2005). More recent focus in this area has concentrated

on further identifying elements that would enable methods for capturing and delivering usage statistics (Digital Library Federation, 2004; Fons & Jewell, 2006).

THE LIMITATIONS OF LOCALLY DEVELOPED ELECTRONIC RESOURCE MANAGEMENT SYSTEMS

Each of the six locally developed electronic resource management systems that have been discussed may be considered successful because of their approach to design. Each was constructed to specifically address the particular needs of its institution, or a perceived user group, but may not encompass all aspects of an ideal electronic resource management system. Appendix B of a Council on Library and Information Resources report which lists the data elements for MIT’s VERA, PSU’s ERLIC, and UCLA’s ERDb, shows clearly that though there is some overlap in the elements these systems encompass, they are distinctly different from one another (Jewell, 2001).

Although they created successful programs, the universities that developed in-house programs are slowly migrating away from them, in favor of commercial products (see Pennsylvania State University, 2006, for example). Much work has been done within the library and vendor communities to co-develop new tools and work together to add functionality where individual in-house programs cannot. The in-house programs have provided a time-limited solution for these universities, and as academic institutions move toward more consortial purchasing, continuing to heartily develop the in-house programs is not time efficient. Most of the in-house tools developed failed with some interoperability problems, the consistent issues being a lack of integration with the library catalog, requiring redundancy of data, and scalability issues. Solutions for some of these issues were generated by librarians and

vendors working together to create community-wide initiatives.

COMMUNITY-WIDE EFFORTS IN MANAGING ELECTRONIC RESOURCES

As institutions sought communication related to the development of electronic resource management systems outside their university boundaries several impressive initiatives were constructed. The Digital Library Federation created an initiative called the Electronic Resource Management Initiative, run by a steering group of members from seven academic institutions; information sharing initiatives such as the Open Digital Rights Language and the Dublin Core Metadata Initiative were developed; and interest in creating standardized license agreement language became evident. These and a number of additional community efforts will be discussed in this section.

Electronic Resource Management Initiative

As institutions realized that effective communication about their common problem of managing electronic resources could lead to satisfying solutions they began to seek discussion outside their own academic institutions. The “Web hub for developing administrative metadata for electronic resource management” was constructed to facilitate the sharing of information about institutions developing their own electronic resource management systems (Chandler & Jewell, 2005). The Web hub was a Web site managed by Adam Chandler and Tim Jewell (no longer updated as of February 2005), which listed the names of the universities that were building systems or creating initiatives to address their own electronic resource management needs. The site also listed descriptions of the systems and contact persons at each university. The site was built so that uni-

versities could read how other institutions were developing their tools, and could communicate with those universities if they had similar needs. The Web hub was a successful facilitator for those institutions that were considering building their own electronic resource management systems but needed more information or support before beginning their projects.

The creators of the Web hub started the Digital Library Federation’s Electronic Resource Management Initiative steering group in 2001. The purpose of the Electronic Resource Management Initiative (ERMI) was to define an essential list of data elements that would construct a full and complete electronic resource management system (Chang, 2003). In addition to defining the data elements, the group sought to develop workflows and promote standards for the management of the data (Digital Library Federation, 2006). The Web hub served as a fertile space from which the ERMI could pull information to begin their discussions.

In the final report of the Digital Library Federation’s ERMI seven functional areas required to construct a comprehensive management system are identified: “listing and descriptive;” “license-related;” “financial and purchasing;” “process and status;” “systems and technical;” “contact and support;” and “usage” (Digital Library Federation, 2004, p. 4). By identifying these functional areas the ERMI hopes to convey accurately to vendors or others wishing to build management systems what elements are needed (Chandler, 2004).

As the Digital Library Federation’s ERMI outlined its own goals it also included conversations with library vendors. By communicating with the vendors the ERMI created a successful ongoing rapport about what was needed to develop a complete electronic resource management system. By including vendors in this discussion the ERMI could provide the data backbone of a system that could then be developed by the vendors; in this way libraries could depend on vendors for development support and collaboration rather than acting as independent system creators.

Standardized License Agreements

Another area of electronic resource management that has had community-wide efforts to streamline is in developing standardized license agreements. A major challenge to the timely management of electronic resources is the often ambiguous or difficult language in which license agreements are worded. These agreements are legally binding, yet many librarians in charge of implementing them often have little or no training in how to interpret their language. As a result license agreements at some libraries are forwarded from a library's acquisition department to a legal signatory for the university, stopping the acquisitions process until the license has been rewritten to have agreeable terms for both the publisher/vendor and the university. This time lag is a major problem for an acquisitions department that is used to a standardized, on-time workflow. In addition to the break in workflow, tracking the progress of a license agreement that is passed back and forth from vendor/publisher to the legal signatory for the university is a challenge.

To counter this difficulty there have been attempts to simplify the language of a license agreement so that they can be quickly agreed upon and signed, providing patrons with prompt access to the materials licensed. In 2000, John Cox constructed five model license agreements, the development of which were sponsored by subscription vendors (Cox, 2000). These licenses are in the public domain and are meant to be altered to fit the specific needs of a particular licensing situation. Yale also offered a standard license agreement, written under sponsorship by the Council on Library and Information Resources and the Digital Library Federation. Yale's license notes, in brackets, the sections of the license that the library is to complete (Yale University Library, 2001). They also offer a best practices short form of the license.

As of 2007 the National Information Standards Organization is sponsoring a working group titled

Shared E-Resource Understanding. This group is charged with developing some guidelines that publishers and licensors of electronic resources can use to establish a fiscal relationship without the inclusion of a written license agreement. Negating the requirement for a written license in favor of simply agreeing in principle on how electronic resources will be used is a step toward more open and collegial working relationships between publishers and their resource licensors.

The Open Digital Rights Language

An effort to disambiguate the language used in license agreements about what users may/may not do with the information, the open digital rights language has created a data dictionary that defines the rights and limitations. Written as an XML document, the language is meant to be interoperable, meaning that the terms used in one instantiation mean the same as in another. The language can be used for a variety of electronic resources, whether they are describing the rights and limitations of a traditional electronic journal or a digital image, audio, or movie (Iannela, 2002).

The Dublin Core Metadata Initiative

Dublin Core is a metadata schema that was designed to help describe data in a consistent way across platforms. It is similar to the open digital rights language (ODRL), yet its focus is on broad resource description, rather than focusing specifically on rights and limitations. The Dublin Core has proven itself to be an internationally successful tool due to its scalability; it is constructed of only 15 elements, each of which is optional, and all may be repeated (Dublin Core Metadata Initiative, 2006). This flexible set of descriptors can be applied to almost any kind of resource. One of the descriptors particularly relevant to this discussion is the element "rights." This field can hold information regarding licensing rights

and limitations for a particular resource or for a group of resources. To promote maximum interoperability, the ODRL and the Dublin Core Metadata Initiative teamed together as of 2005 to begin discussions about how to merge the access rights elements of their two vocabularies.

Other Concepts

As a result of broad discussion surrounding electronic resources the standardization of administrative metadata became an important topic. Administrative metadata can be loosely defined as information about electronic resources that facilitates their management. Data such as resource title, rights and limitations, license terms and dates, and budgeting information may be considered administrative metadata. As more of this metadata is created inside electronic resource management systems it has become clear that a standardization of the information would be beneficial for comparison across resources. Another standardization effort that would assist in sharing data is the automatic exchange of serials data (Jones, 2002). If the metadata about serials could be standardized then the data could be shared between systems without any extra keying, allowing for more accurate data (no typing errors) and freeing staff to pursue other tasks. Usage statistics is a current effort in standardization as well, with hopes that counting web page visits and article downloads can be standardized to facilitate usage comparison between different publications (Fons & Jewell, 2006).

CHANGING COMMUNICATION PATTERNS DUE TO LOCALLY DEVELOPED ELECTRONIC RESOURCE MANAGEMENT SYSTEMS

It is clear that the problem of managing electronic resources motivated librarians to act outside of

their usual environment into a more public role. This movement outside of the normal work setting occurred when license agreements began to be required for the leasing of electronic resources. This necessity pushed some librarians to collaborate with university offices (often general counsel) in order to negotiate and sign the license. The format of the resource itself also required that librarians communicate with systems or technical staff to ensure that it was activated correctly. Acquisitions librarians who may not have had much communication with patrons before also learned to clarify and correct access problems with the electronic resources. These new models of communicating outside of the normal work environment may have had a positive effect on the development of the community-wide efforts in managing electronic resources.

Within one's university setting one acts in one's role; in this way librarians are tied to existing power structures and role expectations. By first working to develop local solutions to electronic resource management and then community-wide solutions librarians took themselves out of their traditional roles. Librarians who had gained enough knowledge about how to develop their own locally designed electronic resource management systems contributed to the wider discussion of developing a management system at the national level. By working outside of their libraries' hierarchies, thrusting themselves instead into peer collaboration with librarians from institutions across the United States, librarians may have created an ideal development environment. Conger suggests that this collaborative, rather than hierarchical, working environment may have contributed to the successes of community-wide development of electronic resource management systems (Conger, 2004, p. 29).

These collaborations on defining elements of a successful electronic resource management system have not included just librarians, but vendor representatives as well. By including the vendor community in defining key elements of

an electronic resource management system, the Digital Library Federation's Electronic Resource Management Initiative (ERMI) steering group was able to negotiate early on what roles each would play in the future development of such systems. The librarians and vendors brought their own expertise to the discussion, broadening it with a variety of approaches and ideas. Systems vendors have, in fact, begun constructing electronic resource management modules that follow the data elements outlined in their collaborations with the ERMI (Grover & Fons, 2004; Meyer, 2005). In this way, system vendors and ERMI members may be viewed as co-developers of these new systems. By creating this kind of diverse, creative working group the members naturally developed a sense of ownership in the outcome. They defined not only a management system but also a model for future successful communications with each other.

SUMMARY

Tasking themselves with identifying new ways in which to manage electronic resources has given librarians alternate communication models from which to work. Creating locally developed electronic resource management systems helped to unify the library communities at Massachusetts Institute of Technology, Pennsylvania State University, and the University of California Los Angeles. Then as those groups began to work outside their institutions they developed what Emery calls a "library enterprise network," or library groups that act as nodes in a wider network, collaborating on a specific task (Emery, 2005). It is this wider network that librarians have learned to create for themselves, and it predicts future successes in forthcoming development tasks.

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