Tools for Mature Management of Electronic Resources Lifecycles in Libraries

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In the beginning was the written word. It is always difficult to know where to begin when one is taking a historical look at a subject. Certainly there are always threads that can lead one farther and farther back in time. In the interests of the brevity of this paper, a choice must be made to specify events or time periods at fairly recent dates, and thus our look at the developments in electronic resource management systems will begin, not with the written word, but with the advent of electronic journals.

It can certainly be argued that there were many electronic resources collected by libraries before online journals became common in the mid 1990's, and many libraries did collect databases on CD-ROMs and even electronic texts. However, if one looks at the processes and procedures in libraries for handling these products, they did not create a significant change. For the most part, handling CD-ROMs or locally loaded databases and electronic texts were treated as small scale unique activities, and their relatively small numbers and their restriction (mainly) to reference collections permitted them to be dealt with merely as adjuncts to the traditional practices of the library.

When the worldwide web permitted the delivery of electronic journals to libraries and the desktops of library users, this changed rapidly. Libraries began acquiring the new online journals with few ideas of where this revolution would be leading. Procedures were developed to fit the small scale of available materials at the time, then rapidly underwent revisions. Legal issues arose, and were addressed, but again without much planning for what might happen when thousands of products were acquired and not just dozens. Online journals were at first merely adjuncts to their print counterparts, and few people thought ahead to when the online versions would be primary and the print versions secondary (if acquired at all). Responsibility for handling electronic resources was at first the province of the interested or the co-opted.

What is truly remarkable about this history we are reviewing is how rapidly events evolved. Only a couple of years after the advent of the first online

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journals, many libraries (of large enough size) were creating new positions for a single individual to deal with electronic resources. This was a recognition of many things. First, that online resources (databases and journals at first) were not going to go away anytime soon. Second, that there were enough of these things, and they were different enough from traditional library resources, that they warranted devoting an individual's time to becoming an expert in them, and to developing a new code of practice. Lastly, it was an admission, although perhaps not an immediately conscious one, that online resources were forcing the beginnings of change on the traditional library organization. How much change, no one had any way to gauge yet.

We now fast forward to the year 2000. By this point, the Digital Library Federation (DLF) had been formed, although it was initially concentrating on the difficulties inherent in digital conversions of library collections or born digital projects. Here is where this history takes on a single person lens. Every one of the individuals involved in what became the DLF Electronic Resources Management Initiative (DLF-ERMI) brought their experiences and knowledge to bear on the issue, and they all have their own starting moments. This author's starting moment was the DLF Forum held in Atlanta, Georgia, in April 2000. The Forum focus was on reviewing the shifts needed to adjust from project to production perspective in digitizing efforts in libraries. The author gave a talk about the growing scale issue in managing acquired digital resources as applied to usage statistics, and how the significant differences posed by this new format created its own set of challenges for libraries (Parker 2000).

Shortly thereafter, the DLF commissioned a study of the many ways libraries were beginning to address the management challenges of acquired electronic resources, and Timothy Jewell of the University of Washington surveyed a number of libraries about their approaches and tools (Jewell 2001). What came to light in this survey was that not only were many libraries developing policies and practices, but many were also building tools to help them with that process, or were adapting existing general tools (like spreadsheets or desktop databases) because the information needed to be managed was both overwhelming and did not fit nicely into the existing structures of library management systems (LMS). Meanwhile, Adam Chandler of Cornell University had established a website, A Web Hub for Developing Administrative Metadata for Electronic Resource Management (http://www.library.cornell.edu/cts/elicensestudy/) to promote sharing of what different individuals and libraries were building in terms of tools to support electronic resource management. A few of those individuals identified in this process organized some informal gatherings at American

Library Association (ALA) conferences to discuss what they were learning. In this process, a number of points became clear.

Some libraries found it burdensome or difficult to maintain a local tool and very much wished for commercial software vendors to take on the challenge so that the libraries could purchase a tool instead of building (and maintaining) one. Other libraries, while willing to maintain or build their own tools, wanted to ensure that the tools were the best possible, supporting a broad range of functions that might not be immediately identified as critical by a single library.

The informal ALA gatherings also included a number of vendor representatives who were intrigued by the obvious need expressed by the libraries, but uncertain of the needed specifications. Electronic resource management needs were a new and unfamiliar area for many people, not least vendors. These gatherings developed a consensus that it was necessary to create some sort of specifications around which to develop the needed software, but it was difficult to make any progress on the needed work in the informal and infrequent setting of the gatherings at ALA conferences. Tim Jewell then approached the DLF with two related proposals. One was a formal DLF initiative to be led by the most interested and active of the ALA gathering participants, charged to develop concrete recommendations for what would constitute an Electronic Resource Management (ERM) system. The second was a joint workshop with the National Information Standards Organization (NISO) to discuss the needs of standards in developing such systems.

One of the drivers for developing guidelines for ERM systems was what LMS tools did not support well. These functions included:

- Generating and maintaining alphabetic and subject lists of journals and/or databases.
- License term negotiation, tracking, and communication processes.
- Multiple staff and department involvement in selection & support of e-resources, i.e. communication and workflows.
- Problem tracking and troubleshooting activities including escalation/triage support.
- Planned, cyclical product reviews or reviews associated with unplanned change (e.g. when a product is shifted between publishers).
- Systematic usage reporting and tracking.

The original ERMI steering group was led by Timothy Jewell of University of Washington, and included Ivy Anderson (Harvard), Adam Chandler (Cornell), Sharon Farb (UCLA), Angela Riggio (UCLA), Kimberly Parker (Yale), and Nathan D. M. Robertson (Johns Hopkins). Only a quick glance at the membership reveals two important characteristics. First is that all of the members were from institutions in the United States. Second is that those institutions were also all major research universities. While perhaps inevitable, in that major research universities in the United States were the first grappling with the explosive scale of electronic resources, the result was an inevitable bias in the work of the group. The members recognized this at the time, but the issue was set aside as it was hoped that later groups would be able to adapt the resulting work for different constituencies.

In addition to the Project Report itself, the end result of the ERMI activities was a group of documents that collectively became a pseudo-standard for work in the area of ERM systems: an analysis of workflow; a listing of functional requirements; a wire-frame diagram providing a snapshot view of concept relationships; a definition listing of involved elements; a detailed analysis of the relationships amongst needed elements; and a hint of future XML work to come (Jewell et al., 2004).

Before we return to the pseudo-standard aspect of the ERMI work, it is useful to spend just a bit more time discussing how each component of the ERMI appendices has come to be used as both the ERM field and ERM systems have evolved. We begin our analysis with the Workflow Diagram, which is a detailed breakdown of the lifecycle work of managing e-resources. While useful in its own right as a tool to communicate the complexity of e-resources activities to those less familiar with the tasks, the Workflow Diagram has been frequently used by institutions desiring to re-examine their organizational approach to managing e-resource activities. This can be illustrated by taking just one small component of the workflow as an example: product licensing.

An institution usually will ask itself three primary questions about a workflow component. Who does the work? How is the work accomplished? And what elements feed that work? Thus, for product licensing a range of more specific questions apply. Who reviews the license? Who negotiates the license (if necessary)? Who signs the license? Who handles the paperwork and any legal storage requirement? What types of job groups are involved in license handling? Does this vary from unit to unit in a large library system or is a single responsible unit designated for the entire library system? How does the

communication about the license (review, negotiation, and result) happen? How are license negotiations facilitated and managed? What does the institution record during and after the license process? What happens when a license is unacceptable? What are the institution's default definitions or standard alternative phrasings?

Reviewing and customizing the workflow to a specific institution is a very useful way to ensure that all involved individuals are operating from the same basis of understanding, and thus is a highly recommended first step in any implementation of an ERM system or reorganization of electronic resource management activities in an organization.

Once we understand the lifecycle of work required to manage electronic resources, the next logical activity is to specify what are the need capabilities of tools to help support that work. This is the role of a functional requirements document. The ERMI Functional Requirements document covers five broad areas with four more specific areas highlighted in the final one: General, Resource Discovery, Bibliographic Management, Access Management, and under Staff Requirements -- General interface requirements, Selection and evaluation processes, Resource administration and management, and Business functions. The Functional Requirements document has been an actively used tool by many libraries who are either developing their own ERM systems or are preparing to select the best available system offered by a third party. Even those libraries that do not conduct a formal product review find the review of the requirements useful in prioritizing which functions of a very complex system they will implement first or at all.

The Entity Relationship Diagram has been variously described as a bowl of spaghetti, an engineering wiring blueprint, or just plain intimidating. For those who are intrigued by such things, or can afford the potential of a headache, the Diagram is a snapshot of the interaction between various pieces of information in the electronic resources world. It succinctly describes whether one group of data maintains a one-to-many relationship with another group, whether one group of data is part of another, and points out the complexities of multiple, possibly conflicting terms that need to be resolved. The main usage of the Diagram has been by system designers reviewing needed database structures.

The Data Element Dictionary is a document comprised of a single long list of all the possible items which one might want to track in an e-resource management system, along with specific definitions for each item, and occasionally clarifying

comments. While the Dictionary is primarily used by system designers to understand the data that will be held and manipulated by ERM systems, the Dictionary can also be used by institutions implementing an ERM system to review which facts an institution wants to manage, review, report, and archive.

The Data Structure marries the Entity Relationship Diagram, the Data Element Dictionary, and to a certain extent, the Functional Requirement document to produce a first rough sketch of what an ERM system database design could be. In addition to fitting the data elements into entity groups, the Data Structure suggests standard entries for elements with limited sets of values, and also notes whether an element is likely to be required, optional, repeatable, etc. Like the Entity Relationship Diagram, the Data Structure is of most interest to system designers.

The final component of the ERMI appendices was a review of the potential for developing an XML transmission of ERMI elements either to facilitate system migration, or where feasible, to permit two or more institutions to share ERMI related data—whether that was the components of a license, business arrangement, product downtimes, or other similar information. This final component was simply a brief assessment and outline of the more in-depth work that would need to be pursued to facilitate this capability.

Aside from the utility of the ERMI work itself, whether for system designers or for libraries reinventing themselves and their practices in a more mature e-resources domain, the work of the ERMI was seminal for yet another reason. While the ERMI report is not, nor was it ever intended to be a formal standards document, the report did serve to rapidly crystallize the recognition of the need for ERM systems and to springboard their development. When developers discussed their intentions and progress with their customer communities, the phrase "ERMI compliant" was commonly used despite its status as only guidelines and recommendations. This kind of pseudo-standards approach can be a way to solve the dilemma caused by the lengthy process for developing standard which stands in direct opposition to the rapid progress in digital information development cycles. It will be interesting to see if a pseudo-standard approach becomes more common over time.

Three years after 2004 when the ERMI Report was published, where are we? There are a comfortable number of commercial vendors with entries in the ERM systems product category. E-resources have continued to evolve. E-resources management is becoming both a mature specialty in libraries, but also a major

driver of organizational change. And, a second ERMI group is reporting on the outcome of their follow-on work (Jewell 2007). This author was not able to continue her engagement with the ERMI project into ERMI 2, so at this point the review becomes a more distant one.

ERMI 2 worked on three activities: usage statistics, license expression, and interoperability questions. The E-Resource Usage Statistics component has seen the development of a protocol for automated delivery of COUNTER-compliant vendor usage data to ERM systems. This has meant the development of the high profile SUSHI standard that we will be hearing more about during this conference.

The License Expression component explored training and license expressions data standards and encountered very interesting questions about the complexity of license data and the value of parsing all pieces of a license. The ERMI 2 group also notes some emerging new trends in e-resource licensing, most notably NISO's Shared E-Resource Understanding initiative, and the impact these may have in simplifying the entire licensing arena.

Finally, the component on Interoperability Between ERMS and ILS Modules explores the need for interactions between ERM systems and LMS systems (particularly acquisition modules) for libraries that operate with systems from different vendors. The ERMI 2 group will be identifying core data elements necessary to facilitate that interoperation.

To wrap up our accelerated historical review, it is interesting to note some recent news items. The first of these was the top ten assumptions for the future of academic libraries and librarians released by ACRL this spring (Mullins et al. 2007). Paraphrasing slightly to make them more universally applicable, there are at least eight of the assumptions to which most libraries can relate.

- There will be an increased emphasis on digitizing collections, preserving digital archives, and improving methods of data storage and retrieval.
- The skill set for librarians will continue to evolve in response to the needs and expectations of the changing populations that they serve.
- Patrons will increasingly demand faster and greater access to services.
- Debates about intellectual property will become increasingly common.
- The demand for technology related services will grow and require additional funding.

- Distance services will be an increasingly common option and will co-exist but not threaten the traditional bricks-and-mortar model.
- Free, public access to information stemming from publicly funded research will continue to grow.
- Privacy will continue to be an important issue in librarianship.

The second relevant news item was from the UK, via the Research Information Network and the Consortium of Research Libraries (RIN & CURL 2007). While a complex and fascinating study, a few findings are confirmations of common understandings in e-resources work:

- a sharp fall in the number of researchers who visit their institution's library regularly
- researchers use digital finding aids to locate both digital and print-based resources
- a growth of collaborative and inter-disciplinary research teams

The main point of highlighting these two news items is that they *begin* from the assumption that digital and electronic resources, services, and tools are now ubiquitous in the library field. E-resource managers no longer need to make the case that digital collections and services of libraries are important. The statement that these collections and services will only continue to develop as the central gravity point of libraries no longer is outré.

Where does this leave us? We are still in a brave new world that will be continually evolving, we still need robust tools to help us in supporting e-products and their related services, but we have the understanding and support of our library colleagues now, and the sympathetic ears and skills of our software vendors to work with us to achieve a more effective and efficient approach to our work.

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