



Article

Management of E-Resources Cataloging Workflows at the University of Maryland, College Park

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Abstract

In 2011, one of the authors, a staff member of the Metadata Services Department at the University of Maryland, College Park, created an electronic resources cataloging management database (ERCM) to manage the details of MARC record set loads to the online catalog. After attending the NISO Standards update session entitled “The NISO ERM Data Standards and Best Practices Review” presentation at the 2012 Annual Conference of the American Library Association, at which cataloging workflow support was referred to as a problem area in electronic resources management, she decided to follow up with an investigation of the nature of the problem and to explore its relevancy to the ERCM. This article will inform metadata services departments about the management of constantly changing electronic resources cataloging workflows and also discuss cataloging workflow as it pertains to Electronic Resources Management System (ERMS) development.

The University of Maryland, College Park campus' full-time enrollment for fall 2012 included 25,028 undergraduates and 6,925 graduate students. Collections in fall 2012 numbered 3.7 million volumes; 17,000 electronic journals (e-journals); more than 100,000 electronic books (eBooks); and more than 352 electronic databases. In January 2013, the Metadata Services Department included nine faculty librarians and 13 non-faculty staff. Electronic resources cataloging work crossed unit boundaries and all categories of staff. In all, 12 of 22 staff members either focused on or touched upon e-resources cataloging work.

In 2011, a staff member of the Metadata Services Department (MSD) at the University of Maryland, College Park created an electronic resources cataloging management database (ERCM) to manage the details of MARC record set loads to the online catalog, ExLibris Ltd.'s ALEPH. Because the benefits of the database quickly became apparent, it was decided to further develop this management tool. To refine structural relational database elements, the MSD staff provided an iSchool student with credit through a field study course from May through July 2012 to assist in the redesign. In June 2012, the staff member attended the American Library Association session entitled "The NISO ERM Data Standards and Best Practices Review," (Jewell, 2012) which highlighted the cataloging workflow issues of electronic resource management, and the authors decided to follow up with an investigation of the nature of the electronic resource management system (ERMS) cataloging workflow problem and its relationship to the ERCM. This article provides a brief literature review of e-resources cataloging workflow issues, followed by the experience at the University of Maryland, College Park in the development of a new tool to manage the e-resources cataloging workflow.

Literature Scan: ERMS and the Cataloging Workflow Support Problem

As defined in *Electronic Resources Management: Report of the DLF ERM Initiative* (Jewell et al., 2004), an electronic resources management system is:

... a system that supports management of the information and workflows necessary to efficiently select, evaluate, acquire, maintain, and provide access to e-resources in accordance with their business and license terms ... through seamless interaction and efficient sharing of data with traditional MARC-based online catalogs, Web portals, federated searching tools, local resolution services, local authentication and access-management systems, and traditional library-management functions (p. 49).

Electronic resources cataloging workflow falls under the category of access provision. The authors did not examine available commercial, open source and in-house ERMSs to determine the extent by which they incorporate electronic resources cataloging workflows.

The literature scan focused on use of ERMSs in support of electronic resources cataloging workflow. The NISO ERM Data Standards and Best Practices Review

Steering Committee (2012) notes that “a key challenge to overcome [in the workflow support problem] is that the term ‘workflow’ means different things to different people” (p. 32). In its Appendix C (p. 51), the Steering Committee selected and provided URLs to a number of libraries’ flowcharts that depict the variations in workflow; these were reviewed with an eye on the cataloging workflows. Five of the seven selected institutions’ workflow documents explicitly identify cataloging as an element of ERM workflow: those of Arizona State University; Deakin University; North Carolina State University (NCSU); the University of California, Los Angeles (UCLA); and Western Michigan University Libraries.

The workflow flowcharts and report by Arizona State University’s (2010) task group presents the findings of their study and makes recommendations for the implementation of Innovative Interfaces Inc.’s (III) ERM module. The workflow flowcharts describe MARCIt!¹ record loads for “full-text ejournal packages and aggregators and potentially for e-books” as well as workflow for cataloging individual titles, e.g., “reference ERs”² (Arizona State University, 2010, p. 8). Both the MARCIt! records and individually cataloged bibliographic records loaded to the ILS will be linked to the ERM resource record to facilitate catalog record maintenance. Catalog record maintenance activities are described but not flowcharted; these include the monthly checking and cleanup of MARCIt! record loads, and the closing or updating of holdings or the deleting of bibliographic records for cataloged electronic resources.

At Deakin University (2010), once a resource is approved for purchase and access is provided, the ERM resource record is updated with the access information. MARC records for eBook collections are downloaded to the catalog. For renewals, the ERM resource record is updated to record whether perpetual access has been obtained or not; next steps include ongoing maintenance of the catalog, including the downloading of MARC records for new titles and removal of catalog records for non-renewed titles. NCSU follows suit: resources are cataloged once activated and accessible. OPAC functionality is verified. If follow-up is required, Acquisitions is notified; otherwise, Collection Management is notified.

The UCLA (2011) “New Electronic Resource Workflow” flowchart separates Acquisitions/Licensing, ERM/Access, and Cataloging workflows. Cataloging follows notification that access to an electronic resource has been turned on. Additionally, prior to notification of access provision, the cataloging unit receives notification of interest in a resource, allowing selectors to be informed of potential problems with the cataloging of the e-resource. Both renewals and non-renewals trigger notification of cataloging. Once the resources are cataloged, ERMS managers are notified.

¹ MARCIt! is an ExLibris product that generates MARC catalog records from the SFX Knowledge Base. SFX is an OpenURL link resolver and ExLibris product (see <http://www.exlibrisgroup.com/category/SFXOverview>).

² “ERs” refers to “electronic resources.”

At Western Michigan University (2010), once a license is negotiated, an order is created in the ERMS and in the ILS. The resource is cataloged and this information is entered in the ERMS. SFX is configured; next, catalog links to e-resources are maintained.

The Electronic Resources Tracking System (ERTS) developed by the Tri-College Consortium of Bryn Mawr, Haverford, and Swarthmore Colleges is a locally developed electronic resources management system with a built-in cataloging workflow management component. While its “predominant mission [is] to track license information,” (Madeiros, Bills, Blatchley, Pascale, & Weir, 2003, p. 29) the cataloging management component supports both cataloging and public services staff. The cataloging workflow is supported in the ERTS title table. Fields identify the type of resource (e-journal, eBook, collection), if a collection is analyzed (multiple titles in a collection, each of which is cataloged), if titles are cataloged individually or by batch, the location of the files of batch loaded records, cataloging instructions, cataloger’s name, and cataloger’s notes.

Shadle and Randall (2011) describe the use of Ill’s ERM module to manage cataloging workflow information at the University of Washington (UW). Three local fields were added to the ERM resource record identifying “the vendor or UW Libraries unit supplying the MARC bibliographic records for the resource” (known as the Bib Source field), the cataloging status, and a cataloger’s note field (Shadle and Randall, 2011, p. 175). Additionally, existing fields were adapted for use by the UW Libraries. The existing Local Contact repeatable field was adapted to include the contact information of the appropriate catalogers. A benefit of using this field was its ability to generate “e-mail ticklers ... to alert staff to the need of cataloging” (Shadle and Randall, 2011, p. 176). The Identity field of the ERM license record was adapted for use in managing information about the licenses for the MARC record sets as opposed to the licenses of the resources themselves (Shadle and Randall, 2011). It is noteworthy that existing system functionality allows cataloging staff to link directly to the collection level records as well as to the analytic catalog records from the ERMS.

Lupton and Salmon (2012) describe ERMS functionality enabling the uploading of MARC records for e-resources from the ERMS to the library’s discovery system at York University.

Schmidt (2012) reports that the technical services division at the American University (AU) Library is working to transfer information managed in a MARC record set spreadsheet that tracks “frequency of release, technical contacts, location code based on type [of eBook workflow], date of first batch load, date of most recent batch update, cataloging staff responsible for the collection, and any special notes” (p. 306) to its implementation of CORAL, an open-source ERMS created at the University of Notre Dame Hesburgh Libraries. AU’s eBook workflow types include single titles purchased from the publisher, eBook packages, patron driven acquisitions from eBook vendors, and purchased eBook collections (Schmidt, 2012).

Hartnett, Beh, Resnick, Ugaz, and Tabacaru (2013) report that the Texas A&M University Libraries will investigate CORAL “functionality ... meant to assist with cataloging workflow,” (p. 27) introduced by the Hesburgh Libraries in May 2012, at a later date. Cataloging workflow elements in the Texas A&M “ERM Wish List” include the ability to record the “person responsible for cataloging,” information about MARC records (“availability, price and quality,” and “schedule and source of records”) and the ability to notify cataloging of changes to a resource or of a resource’s availability for cataloging (Hartnett et al., 2013, p. 35-36).

The UM ERCM: Background, Benefits, and Next Steps

In November 2010, the UM Libraries began routinely loading MARC record sets for electronic resources collections into the ILS in an attempt to support the discovery of eBook and other e-resource sets that could not be well represented on a title-by-title basis in ExLibris Ltd.’s MetaLib federated search system. A cross-divisional e-resources management group utilized a spreadsheet listing collections in need of cataloging as an electronic resources cataloging management tool. At the time, as now, the UM Libraries had no ERMS. The spreadsheet soon became too cumbersome to work with and has not been used since 2011.

The electronic resources cataloging management database (ERCM) was initially designed to support the management of the MARC record set loads. Management of record set loads included timely reporting to collection managers on the status of the loads (see Figure 1). The database was created using Microsoft Access, a tool supported by UM and available to faculty, students, and staff through a licensing agreement with the University System of Maryland and Microsoft. The database design was initiated after staff attended a Microsoft Access introductory level one-day training session in February 2011, and a secondary level one-day training session in March 2011. The campus Division of Information Technology staff provided these sessions.

MARC Record Sets, Priority Order				
Set Descriptive Name	Set Name	Priority	Loaded/Complete	# of records
Women and social movements in the United States 1600-200				
Classical music in video				
Filmakers Library Online				
North American Indian thought and culture				
North American theatre online				
American History in Video	AHIVcp	1	2/16/2012	931
Counseling and Therapy in Video	CTIVcp	1	11/2/2011	256
CREDO Reference	CREDOcp	1	4/27/2011	680
Education in Video		1		
Making of the modern world	MOMWcp	1		59196
Sabin Americana		1		
Safari books online		1	12/11/2008	1042
Safari books online	Safari2012Acp	1		169
SPRINGER COMPLETE COLLECTION ENGLISH/INTERNAT	SPRCC2005cp	1	10/7/2011	2964
SPRINGER COMPLETE COLLECTION ENGLISH/INTERNAT	SPRCC2006cp	1	9/14/2011	3015
SPRINGER COMPLETE COLLECTION ENGLISH/INTERNAT	SPRCC2007cp	1	7/21/2011	2713
SPRINGER COMPLETE COLLECTION ENGLISH/INTERNAT	SPRCC2008cp	1	6/9/2011	3118
SPRINGER COMPLETE COLLECTION ENGLISH/INTERNAT	SPRCOMCOL2009	1	2/17/2011	3890
SPRINGER COMPLETE COLLECTION ENGLISH/INTERNAT	SPRCOMCOL2010	1	1/21/2011	3176

Figure 1. Report for library staff on the status of the record set loads.

The value of the database to MSD staff extended to work in related areas. For example, Collection Management initiated a project to withdraw the print volumes held as equivalent e-versions in the Credo Reference collection. A Credo MARC record set was loaded into the ALEPH ILS in April 2011. In July 2011, an MSD project manager received a spreadsheet from the Libraries' Manager of Collections identifying the print titles for which equivalent Credo Reference e-versions had been purchased. The spreadsheet listed ALEPH system numbers, OCLC numbers, imprints, titles, ISBN, call numbers, and barcodes. Before withdrawal of the print titles, the project manager needed to verify that a MARC record in the catalog existed for each equivalent e-version of the resource. The project manager's usual option would have been to search ALEPH, title by title, since the print version ISBN, OCLC numbers, call numbers, etc. would be of little use in retrieving the e-version records. Because her responsibilities included the MARC record set loads, the project manager sought a more efficient method to verify the existence of an equivalent e-version record for each print version record listed in the spreadsheet by using MarcEdit (<http://marcedit.reeset.net/features>) to organize the data. From the Credo MARC file, saved as an attachment in the database, a new spreadsheet was generated listing the titles, subtitles, statements of responsibility, imprints, and OCLC numbers of the e-version records. The spreadsheets were easily compared to determine where equivalents and gaps between records for the print and e-versions of the resources existed, thereby facilitating the completion of the project.

As the benefits of the database became apparent, its scope was expanded to manage individually cataloged titles in collections acquired on standing orders or subscriptions, or freely available and selected by collection managers. Further database expansion called for more than novice experience with relational databases. In May 2011, the Dean of the Libraries announced support of an initiative to take advantage of the UM College of Information Studies' requirement that all non-thesis option students in the MLS program complete a three-credit field study course appropriate to their courses of study. Thus, from May through July 2012, with the help of a University of Maryland iSchool student seeking this type of experience, the database was reviewed, evaluated, and redesigned to incorporate relational database principles; e.g., the use of primary keys for database entity relationships. Data entry forms (see Figure 2) were created and documentation regarding how to enter data was written by the student to provide instruction for staff members unfamiliar with Microsoft Access (see Appendix A).

The screenshot shows a Microsoft Access data entry form titled "frmeBooksMgmt". The form is organized into several sections:

- Collection Information:** Collection Name (New directions for adult and continuing education), Priority (empty), Assigned? (checked), Catalogers (Tanisha, Erica), Monitor (Donna), Up to date? (checked), last status date (6/12/2014), Status (Ongoing), Content Provider (John Wiley & Sons), Monographic Series? (checked), Order number (CP8900010567).
- Identifiers and Dates:** Print ISSN (1052-2891), eISSN (1536-0717), last status date (6/12/2014).
- Processing and Frequency:** OCLC YBP? (unchecked), ACQ notifies? (unchecked), Reflector? (unchecked), Reflector Name (empty), Mono PO? (unchecked), Pub Freq (Irregular), Avg/month (empty), ID (1), If series latest no cataloged (105).
- URLs:** Classic Catalog URL (<http://catalog.umd.edu/docno=001800077>), Research Port URL (empty).
- Notes:** PRINT CANCELLED with no.104 (2004); Wiley Online Library 2014 Full Collection, 1997 volume 1997, issue 1 through presen

Figure 2. Data entry form.

When the iSchool student joined the Metadata Services Department, there were four departmental staff members separately managing several streams of electronic resources cataloging work performed by numerous staff members within the department. These streams primarily encompassed the cataloging of individual titles received via firm orders, subscriptions, memberships, etc.; and the MARC record set loads. In late 2011, the UM Libraries implemented WorldCat Local as a discovery tool and began adding collections only to WorldCat Local rather than to the ILS. Next, in the summer of 2012, the division added new electronic resources cataloging workflows for an eBook approval plan and for firm-ordered eBooks.

The main components of the electronic resources cataloging management database are the record set table and an individual title cataloging workflow table. There are separate tables for cataloging staff names and for content providers' names. Content providers' names, e.g., *Alexander Street Press*, are sourced from the Library of Congress Name Authority File (LCNAF). The content providers table includes the Uniform Resource Identifier (URI) of the data value at the LC linked data site, <http://id.loc.gov/>. Figures 3 and 4 depict both the content provider table entry and the LCNAF entry for Alexander Street Press.

Content Provider	ID	LC NAF URI
Alexander Street Press	1	http://id.loc.gov/authorities/names/no2002055633
Credo Reference (Firm)	2	http://id.loc.gov/authorities/names/no2007075121
Gale (Firm)	3	http://id.loc.gov/authorities/names/no2008071348
Springer (Firm)	4	http://id.loc.gov/authorities/names/nr2005022094
NewsBank, inc.	5	http://id.loc.gov/authorities/names/n80050618
ProQuest (Firm)	6	http://id.loc.gov/authorities/names/n2007068018
Wiley Online Library (Or	7	http://id.loc.gov/authorities/names/no2011037856
Knovel (Firm)	8	http://id.loc.gov/authorities/names/nr2001027264
Brown University	9	http://id.loc.gov/authorities/names/n79056113
William S. Hein & Comp	10	http://id.loc.gov/authorities/names/n83208064

Figure 3. Content provider table.

LIBRARY OF CONGRESS

ASK A LIBRARIAN | DIGITAL COLLECTIONS | LIBRARY CATALOGS

The Library of Congress > Linked Data Service > LC Name Authority File

Alexander Street Press

From [Library of Congress Name Authority File](#)

Details | Visualization

Alexander Street Press

URI(s)
> <http://id.loc.gov/authorities/names/no2002055633>

Instance Of
> [MADS/RDF CorporateName](#)
> [MADS/RDF Authority](#)
> [SKOS Concept](#)

Scheme Membership(s)
> [Library of Congress Name Authority File](#)

Figure 4. LCNAF data value for content provider's name.

Database elements considered critical in the record set loads table include cataloging priority (provided by Collection Management), date of load to the catalog, number of records in the set, a brief set name to be used in retrieval of all the records in a set (e.g., “CREDOcp” as in Figure 1), content provider’s name, purchase order number, and the MARC file that was loaded to the ILS.

For the individual title cataloging workflows, critical data elements in common with the record set loads table are collection name, e.g., *Methods in Enzymology*; content provider’s name; and for titles in collections that are received on subscriptions or standing orders, purchase order number. Other critical elements of this workflow table are

- names of the cataloging monitors,
- names of the catalogers,
- status of the work (either ongoing or complete),
- notation of the status date,
- reflector name (i.e., method of notification of new titles entering the cataloging queue),
- processing instructions for the collections (uploaded as attachments), and
- a URL link to the OPAC serial or integrating resource collection record, e.g., <http://catalog.umd.edu/docno=003324235>, unless suppressed from public view in the OPAC.

As in the record set loads table, a note field allows cataloging managers to record information considered to be important, e.g., “Only publicly available e-books (ca. 650 titles).” Additionally, the table provides a value to identify publications received as serial monographic series, and if so, fields to record additional data, including the last number cataloged (see Figure 5). For monographic series titles for which publishers/providers offer no alert services, this data allows effective means of identifying titles in need of cataloging for those series published in numerical sequence. Although this requires ongoing monitoring and updating of the database, it allows proactive management of a workflow that at an earlier point in time had dropped off the cataloging grid.

Collection Name	If series latest no	Reflector Name	Content Provider	Monographic Series?	Print ISSN	eISSN	
Annals of the New York Academy of Sciences		elecjrnl	John Wiley & Sons	<input checked="" type="checkbox"/>	0077-8923	1749-6632	Ⓜ(1)
Carl Beck Papers in Russian and East European Studies	2303	lib-ebooks	University of Pittsburgh, University Lib	<input checked="" type="checkbox"/>	0889-275X	2163-839X	Ⓜ(0)
CREDO (Print to E)			Credo Reference (Firm)	<input type="checkbox"/>			Ⓜ(0)
DQR studies in literature			IngentaConnect (Online service)	<input checked="" type="checkbox"/>	0921-2507	0921-2507	Ⓜ(1)
ebrary		lib-ebooks	ebrary, Inc.	<input type="checkbox"/>			Ⓜ(0)
Gale Virtual Reference Library			Gale (Firm)	<input type="checkbox"/>			Ⓜ(0)

Figure 5. Table values identifying monographic series data.

Cataloging department staff members use the reflectors that identify the method of notification for items new to the cataloging queue in different ways. Content providers’ alerts sent to the reflector signal both addition and withdrawal of e-resources from the collection (see Figures 6 and 7). Cataloging monitors may also make use of the reflectors to communicate the status of their work to collection managers. For example, the monitor may send a response back to the reflector that the catalog records for titles withdrawn from a collection have been removed. For some collections, the cataloging monitor simply forwards the alerts to cataloging staff responsible for the work as noted

in the note field. For other collections like eBooks received on the approval plan, cataloging staff responsible for the work report back via email to the cataloging monitor via the reflector once the cataloging is complete (see Figure 8).



Figure 6. Content provider notification of resource availability.



Figure 7. Content provider notification of resource withdrawal.



Figure 8. Staff forward alerts back to the reflector to indicate completion of work.

The ERCM allows cataloging managers to quickly access information that is not easily retrievable or entirely available in the ILS and not easily managed through spreadsheets and/or documents in shared folders on the Libraries' LAN. For example, prior to the development of the database, cataloging procedures for individually cataloged titles in collections were stored in departmental folders on the LAN. Finding them involved the opening of several folders and the eyeballing of a title-by-title list, which proved time consuming. With the database, cataloging managers simply open the "manual" (individual title) workflows table to obtain the procedures.

This one-stop shop for cataloging workflow management is an effective staffing management tool. For example, when a staff member took a short leave of absence from work, the MSD head was able to utilize the database to quickly determine which among the staff member's cataloging assignments could be temporarily suspended, which should be temporarily assigned to other staff, and to whom the work could be assigned. In addition, the department head had easy access to the processing instructions for the staff members who would be taking on the work.

Implementation and development of the ERCM has indirectly supported the expansion of the skillsets of division staff. Previously, the use of a MARC file to generate a spreadsheet to facilitate a withdrawal project was discussed. Whereas the MSD project manager had experience working with MarcEdit to process record sets, she subsequently learned to use the program to generate spreadsheets for use in streamlining her work in other areas.

Maintenance of the database has yet to present a challenge to the department. However, unaddressed issues remain. For example, reports on individual catalogers' workloads have not been designed, although the database enables their production. Another area yet to be addressed is whether there is a need to utilize the database as a management tool for the workflow of record set loads to the discovery tool, WorldCat UMD. Cataloging coordinators activating collections in the WorldCat Knowledge Base and updating holdings on the bibliographic records in WorldCat will need to determine if there are unmet management needs for these workflows. If so, database functionality to address this will be explored.

Between Bibliographic Record Addition and Deletion: Filling in the Blanks in Cataloging Workflow Support

As gleaned from the literature review and from the University of Maryland's ERCM implementation, the authors believe that electronic resources cataloging workflow support should satisfy the following functional requirements listed in the ERMI Report (Jewell et al., 2004):

12. Provide a single point of maintenance for bibliographic and auxiliary descriptive data that can be exchanged or shared between the OPAC, portal lists, federated search tools, local resolution services, and other bibliographic systems and services...

30. Establish a site-defined routing workflow for resources that are approved for purchase. For example, it should be possible to send notifications to designated staff or departments or to place resources in a queue for further action by those units to trigger actions such as the placing of an order, completion of cataloging, and implementation of access management by designated staff; and

31. Purge rejected records from the system.

38. Support the administration of e-resources, ...
- 38.5. record cataloging-related data such as,
 - 38.5.1. the availability and quality of MARC records for package items that include individual entities, including the status of loading or prioritization and additional notes
 - 38.5.2. the person or unit responsible for cataloging, if applicable
 - 38.5.3. related specifications, such as specific entries or other data to be included in cataloging records. (Jewell et al., 2004, pp. 52, 56, 57-58)

The inclusion of files of records batch loaded to the catalog or discovery system serves in meeting ERMI functional requirements 12 and 31 above. III's ERM e-mail ticklers alerting catalogers to the availability of new e-resources fulfills ERMI functional requirement 30 above. The University of Maryland, College Park's notification of the availability of new e-resources uses reflectors coupled with manual updating of data in the ERCM when content providers lack alert services.

Additional substantive cataloging work that takes place between the addition and deletion of bibliographic records needs to be supported. The Tri-College Consortium's Electronic Resources Tracking System, the University of Washington's ERM system, and the University of Maryland, College Park's ERCM use elements to designate

- collections that are analyzed,
- catalogers' names,
- cataloging instructions (recorded in a dedicated field in one database, a free-text note field in another, and uploaded as an attachment in another),
- a means to distinguish whether cataloging is done individually or by batch,
- the ability to link to or retrieve the analytic individually cataloged records in a collection from the ERMS resource record, and
- a field in which to record notes.

In common with the aforementioned, American University plans to incorporate a means to record cataloging staff names and cataloger's notes into its ERMS.

Additional elements included in UM's ERCM are

- cataloging monitor,
- cataloging status,
- notation of the status date,
- record set load date, and
- cataloging priority.

At the University of Maryland, College Park, responsibility for monitoring different streams of work performed by different individuals does not lie on a single staff member, thus a need for identification of the responsible staff monitor exists. Cataloging status is also recorded at the University of Washington. Record set load date is designated for inclusion in its ERMS by American University. Cataloging priority, an element defined in

the ERMI data dictionary (Jewell et al., 2004), is an element of value to staff in UM's Metadata Services Department.

Access to licenses for MARC record sets purchased by a library is an important element of cataloging workflow. The University of Maryland Libraries purchased only a limited number of record sets from the resource providers themselves; generally, a clause in the resource license covered the conditions of use for the records. The licenses for e-resources at UM currently reside on a shared folder on the Libraries' LAN until the implementation of an ERMS is completed.

We identified 13 elements of importance to the cataloging workflow of electronic resources through an ERMS (see Table 1).

1	A field or fields to support bibliographic data files such as MARC record sets.
2	Email ticklers or alerts to cataloging staff with notifications of new, withdrawn, and changed titles; cataloging staff ability to alert others with resource status updates.
3	Ability to identify collections that are analyzed.
4	A field to identify catalogers' names.
5	A field to support cataloging instructions.
6	Ability to identify whether cataloging is done individually or by batch.
7	Ability to link to or retrieve the analytic records in a collection from the ERMS resource record.
8	A field in which to record notes considered to be important by the cataloger/cataloging monitor.
9	A field to identify "cataloging monitors."
10	Ability to record the record set load date.
11	A field to identify cataloging status, e.g., "ongoing" or "complete".
12	Accommodations to include access to licenses for MARC record sets.
13	A field to identify cataloging priority.

Table 1. Cataloging Workflow Elements to Incorporate in ERMS Development

Additional Thoughts: Electronic Resource Title, Resource Type, and Organization Name

The element "title" in the Tri-College Consortium's ERTS and the element "collection name" in UM's ERCM are the equivalents to the ERMI data dictionary element "electronic resource title", or "ertitle" (Jewell et al., 2004, p. 94). The ERMI data dictionary note for ertitle echoes standard cataloging practice: "the electronic resources title should be taken from the chief source of information (usually a title screen; the title proper of an electronic resource)" (Jewell et al., 2004, p. 94). Variation in content in the

ertitle field is seen in both databases. In the Tri-College Consortium’s ERTS it can be a “title of individual journal, of collection, of aggregation, or of electronic service” (Madeiros et al., 2003, p. 34). The source of a collection name has been inconsistent at UM; generally three patterns for naming the collections have emerged:

- Use of a catalog record title, e.g., Smithsonian global sound for libraries, sourced from the WorldCat database, <http://www.worldcat.org/oclc/739134810> (see Figure 9);
- Use of a locally assigned collection name, e.g., *Methods in Enzymology*; and
- Use of a name supplied from the content provider or other external source, such as OCLC. For example, the collection name, *Springer Complete Collection English/International 2010*, is sourced from OCLC (see Figure 10).

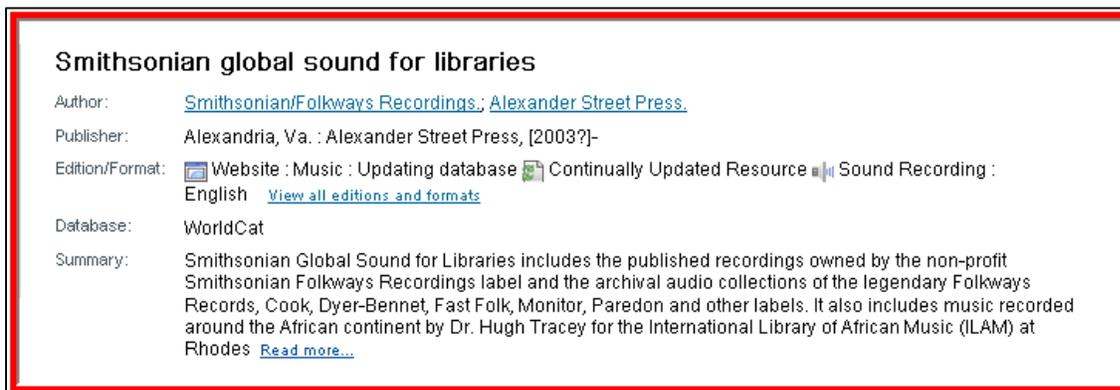


Figure 9 Collection name sourced from a WorldCat catalog record.

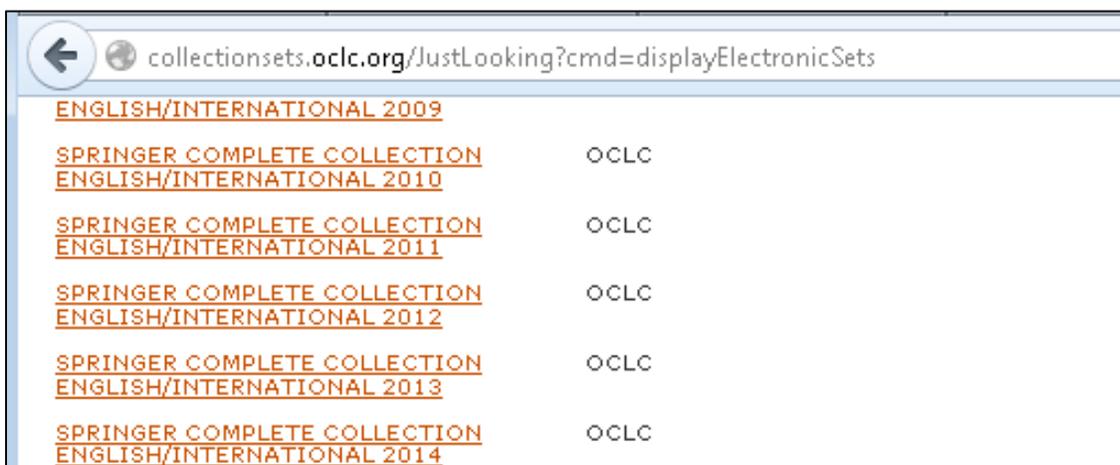


Figure 10. Collection names sourced from the OCLC WorldCat Collection Sets website.

Madeiras et al. (2003) apply descriptive terms such as “collection” and “aggregation” in the title table as values in a format field specifying type of resource (p. 34); this field corresponds to the ERMI data dictionary element “resource type”. Examples provided by Shadle and Randall (2011) show that cataloging workflow elements incorporated into the University of Washington’s ERMS are applicable to collections of e-resources, be it a complete collection or an ongoing collection of a provider’s digitized publications. Similarly, analyzed monographic collections (e.g., a collection of streaming videos) comprise the bulk of electronic resources managed by the ERCM, thus the resource type value was not considered necessary at UM.

At the University of Maryland, the cataloging of individual titles with substantive similarity to their print counterparts is not managed via the database. E-resources published and made available by providers along traditional lines, e.g., a subset of selected e-journals within a package published by the American Chemical Society, have been integrated into the traditional acquisitions and cataloging workflow in the ILS since the late 1990s at UM. Rather than a physical volume in the physical cataloging queue, however, a printout of the ILS record for each of the titles is placed in the physical cataloging queue by Acquisitions staff.

The ERMI Report (Jewell et al., 2004) identified as one of the most important functional requirements of an ERMS its “ability to manage the relationships among bibliographic entities (i.e., individual titles) and the packages, licenses, and interfaces through which they are made available” (p. 36). Whereas the Tri-College Consortium’s database was designed to manage the workflows of several types of e-resources, the ERCM was designed to manage only collection level workflows; yet, the management of bibliographic relationships among the collections and the titles held within them has also been made possible with the ERCM.

Beyond ERMS, work is being done to manage relationships among bibliographic entities and the packages through which they are made available. For example, the *ONIX for Serials Codelists* (EDItEUR Limited, 2012) includes data elements identifying resource type (eBook, print serial, tangible serial, online serial, collection of eBooks, and mixed collections of both eBooks and e-journals in either tangible or online form) in conjunction with elements that identify the title source, e.g., “the full text of the cover title of a serial, or the title on a serial content item or a reviewed resource ... [the] key title ... title in original language [for translations] ... title acronym or initialism ... title of a serial taken from the sender’s product catalog,” and others. (Codelists Issue 5, List 15S). An ERMS field identifying title source, used in conjunction with the ertitle and resource type elements might be useful to manage the relationships among bibliographic entities and the collections in which they are held, and to enable effective data transfer from one system to another. Further research is needed in this area.

Finally, it is important to point out that the UM Libraries’ ERCM takes advantage of an established standard vocabulary, the LCNAF, in the management of cataloging workflows. This feature conforms to a principle set forth in the ERMI Report, which is to

use standard identifiers, making “it possible to exchange certain kinds of information far more reliably and precisely than at present” (Jewell et al., 2004, p. 44).

In the “organization name” field as defined in the ERMI data dictionary (Jewell et al., 2004, p. 106), use of a standard vocabulary such as the LCNAF reduces the effort required in assigning organization names within a system, provides ease in global updating of fields within a system, and better serves to facilitate data exchange and maintenance activities across systems.

Conclusion

Overall, cataloging workflow surprisingly does not appear to mean different things to different people whose duties encompass e-resources cataloging management. Several elements enumerated above have been implemented or planned for implementation in electronic resources management systems at two or more of the institutions discussed. The cataloging components of the electronic resources workflow flowcharts and databases described support metadata services department staff whose objectives include resource description and provision of access to e-resources. The need to manage electronic resources cataloging workflows has driven innovative approaches through use or planned use of electronic resources management systems. The UM Libraries’ endeavor to provide access to electronic resources via its discovery system rather than its online catalog will affect the way in which it manages that access. When technology or administrative goals change, management tools such as relational databases have proven to be flexible, and when based on sound design principles, offer support of “a capacity for global updating and flexible addition of fields” (Jewell et al., 2004, p. 49).

The authors of this paper endorse the Steering Committee’s recommendation that NISO “continue to encourage ... initiatives targeting specific functional needs while advocating for and pursuing alternate strategies aimed at interoperability” (NISO ERM Data Standards and Best Practices Review Steering Committee, 2012, p. 1). We agree with the Steering Committee that workflow support should be more robust in future ERMSs, to allow library staff in all areas to maximize the use of their time. If ERMS workflow support should expand further into the area of cataloging, then critical data elements would already be in place once the resources are ready to be cataloged. Only data for which cataloging staff are the authority would be necessary for those staff to enter into the system. As an added bonus, an opportunity for cross-training between cataloging staff and staff in other areas would present itself. The Committee’s work to further the discussion of workflow support in the context of development of next generation ERMS is appreciated by the authors of this paper.

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Appendix A

ERCatalogingMgmt Database Documentation

General notes on use and terminology:

The database is located on the M drive, with the following file path: Technical Services – Metadata Services-Electronic Resources-E resources Cataloging Management. It may also be opened within Microsoft Access, found in the Microsoft Office Suite. The file name is ERCatalogingMgmt.accdb. The database contains tables, queries, forms and reports. All tables begin with tbl, queries with qry, forms with frm and reports with rpt. Tables can be opened, but were not designed to accommodate data entry or analysis. The forms were designed for data entry by staff and management, and the queries and reports are useful for analysis and task management.

Because the database is on a shared network, it is possible that more than one person may be entering data at the same time. For this reason, one should periodically requery data by pressing SHIFT +F9. The database is set to automatically refresh every minute, but that may not include newly entered data. Additionally, if the database is open for more than a few minutes it is likely to experience network interruptions. When this occurs, the data may all become blank, or appear as pound signs. It is best to close the database and reopen it. Access should have saved any changes you made, and all of the data should be intact.

Before entering a new eBook set:

When entering a new e-book collection, first check if the content provider is already included in rptContentProvider. If it is, proceed to step 4. If not, enter the new Content Provider by following the instructions below.

Procedures for adding a new e-book collection:

1. Find the Library of Congress Name Authority File in Connexion, and locate the URI from <http://id.loc.gov>.
2. Open frmNewProvider. Enter the content provider in the Content Provider column. Leave the ID field blank; it will be automatically updated. Copy the URI from id.loc.gov and paste it into the LCNAF URI field.
3. Click “save,” or press CTRL + S, and close the frmNewProvider.
4. Open frmEBooksMgmt. On the bottom of the screen, press the “new (blank record)” button denoted by a yellow asterisk.
5. Enter the Collection Name and order number in the appropriate fields.
6. Click the Content Provider box and select the correct provider from the list.
7. If it has already been assigned, click the button in the assigned column. If it has not been assigned, skip to step 9.

8. Use the drop down menus to select the monitor catalogers that have been assigned. More than one cataloger may be selected.
9. Select either “ongoing” or “complete” for the Status field. Any continuing resource or database that will have new titles added to it is considered ongoing.
10. Record the date in the Last Status Update field by selecting the date on the pop-up calendar. The current date is the default. Each time a record is updated or initially input, the date should be recorded. For “complete” projects, the Last Status Date should be the date it was completed.
11. Enter the data for the remaining checkbox fields (ACQ notifies?, Reflector?, Mono PO?, and Monographic Series?).
12. Enter text as available for the remaining fields. The priority and avg/month fields must be numbers. The Research Port URL, when applicable, should be in Direct URL format, not the Host URL. To locate this URL, find the database in Research Port, and click on the “i” information icon and copy and paste the Direct URL. The Classic Catalog URL is found at the bottom of the full MARC tags view listed as “Direct URL.”
13. Click "save," or press CTRL + S, and close frmBooksMgmt.

Procedures for updating e-book sets:

1. Open frmBooksMgmt and press the “advance” arrow icon on the bottom of the form until the record to be updated is reached.
2. Enter data in to the fields as necessary, and check if the series or collection is up to date.
3. If there is any documentation available, such as cataloguing guidelines for specific e book sets, include them as an attachment, by selecting “manage attachments” and locating the file.
4. Click “save,” or press CTRL + S, and close frmBooksMgmt.

Procedures for adding a new staff member:

1. To add an employee to the database, open frmNewStaff.
2. Simply enter the given name, family name and initials in the appropriate fields, ensuring that there are no duplicate initials in use.
3. Click "save," or press CTRL + S and close frmNewStaff.

Procedures for generating reports and queries:

1. Reports are automatically generated each time they are opened (assuming the data has been previously saved. If the data is not updated, you may need to click “Refresh All” to load the new data.
2. RptMonitor lists basic information regarding the status of e-book collections. To generate a report for a specific staff member, move the cursor and click into a field with that staff member’s name in the Monitor field. Then click on

- the “Selection” icon in the Filter Tab. Choose “Equals ...” and the report will now only list the Collections that staff member is responsible for.
3. To see a list of only those collections which are monographic series, click on any box in the Series? Tab. Click “Selection” and select “is not 0”.
 4. It is also possible to filter the results by date. Click into any date and click on “Selection” in the Filter tab. You may choose only dates before or after the highlighted one, or you may select a date range.
 5. To return the report to the full view, simply remove the filters by clicking on “Advanced” and selecting “Clear All Filters”. If you want to be able to see the full report and the filtered one, you may click “Toggle Filter” instead of removing the filter.

Procedures for creating new reports and queries:

1. Click on the “Create” tab at the top of the screen. In the reports section, launch the Report Wizard or the Query Wizard.
2. By following the steps the Wizard take you through, you can design your own report with fields from tables and queries, and group the data as suits your purposes.
3. To alter the layout or the format, you must choose either the “Layout” or “Design” views from the “Home” tab at the top of the screen. When you are done, go back to “Report” or “Print” view.

Authors Note

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