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Guest Editorial

The Digital Preservation Imperative: An Ecosystem View

Brian E. C. Schottlaender

Brian E. C. Schottlaender is the Audrey Geisel University Librarian at the University of California, San Diego. I am pleased to have a guest editorial from a former ALCTS president to provide through *LRTS* a larger audience for this important and emerging topic. This guest editorial is adapted from an essay that appeared in the (UC San Diego Library) *Faculty File*, Spring 2013, pages 2-3.

As the information universe becomes increasingly digital, there is a growing need to preserve digital assets that represent the intellectual capital of scientific disciplines, educational communities, and government and cultural agencies. This need is both quantitative and qualitative in nature. Digital resources, particularly digital data, are proliferating at a staggering rate. According to the International Data Corporation (IDC), the amount of data worldwide grew 48 percent between 2011 and 2012 to 2.7 zettabytes, or 2.7 billion terabytes.¹ Additionally, digital resources are qualitatively different from analog resources (print and media) in terms of fragility and complexity.

Digital information resources are fragile in ways that differ from analog information resources, largely because they are far more dynamic. Consider the following:

- they are easily and frequently revised/updated, linearly (v. 1.0, v. 2.0, v. 3.0, etc.) or cumulatively
- they may be available in various “views” (e.g., a data set rendered in SQL looks very different from the same data set rendered in Visual Studio)
- they can be more easily altered by someone other than the original creator
- they are more susceptible to corruption over time
- the storage media on which they reside typically have a far shorter life span than their analog storage counterparts

However passé it may be, paper, for the most part, is pretty durable.

The most immediate and significant consequence of the dynamic nature of digital information resources is that their preservation calls for a much more active process than that required for analog resources. Passive preservation (“put it someplace cold and dark and throw away the key”) simply will not work in the digital environment. The bits have to be kept moving and need to be checked and rechecked to ensure that they do not become compromised or succumb to data decay.

Digital resources are not just more fragile than their analog counterparts—they are also more complex. In the analog world, a book appears to be a wonderfully simple thing. Scan it into digital form, however, and it becomes a “complex digital object,” full of individual elements (i.e., pages) that must relate to each other in a certain order, an order that must be preserved if the book is to be

readable. Moreover, it is easy to link from one digital object to another, creating an even more complex digital object that raises questions about what exactly should be preserved. Some types of resources (multimedia, for example) are completely dependent on the software that renders them usable, yet others, such as e-books, are also dependent on the hardware required to make them accessible.

While preservation has never been a single-agency undertaking, this combination of prolificacy, fragility, and complexity calls for an ecosystem approach to digital preservation, and to digital stewardship, in general. This approach includes three essential elements: access, management, and preservation. Curators tend to view this ecosystem as a cycle, whereas technologists see it more as a stack. Regardless of how one views it, the components are by and large the same.

Following are examples of each ecosystem element:

- The access component is manifest in portals like the Pacific Rim Library (PRL), developed by the Pacific Rim Digital Library Alliance (<http://prl.lib.hku.hk/exhibits/show/prdla/browse-collections>); Calisphere, developed by the University of California's (UC) California Digital Library (www.calisphere.universityofcalifornia.edu); and the Digital Public Library of America (DPLA), developed by a coalition of libraries led by Harvard (<http://dp.la>).
- The management component is exemplified by DSpace, open source repository software developed by the Massachusetts Institute of Technology; Fedora (Flexible Extensible Digital Object Repository Architecture), a digital asset management architecture developed by the University of Virginia (UVA); and the Digital Asset Management System (DAMS), developed by the UC San Diego Library (UCSD).

- The preservation component is well represented in Chronopolis, developed by UCSD, the University of Maryland, and the National Center for Atmospheric Research (NCAR); HathiTrust, developed by UC and the University of Michigan (UM); and the Academic Preservation Trust, under development at the University of Virginia.

These ecosystem elements have multiple and variable relationships with one another. Some of the UCSD content managed in DAMS is syndicated for discovery purposes in Calisphere and replicated for preservation purposes in Chronopolis, for example.

The newest player to emerge in the ecosystem is the Digital Preservation Network (DPN) led by UV, Stanford University, the University of California, UM, and the University of Texas. DPN (pronounced "deepen") was conceived as a backbone to unite and provide common services to the preservation elements of the ecosystem, including services like transmission, replication, auditing, and succession. Similar to Internet2, moreover, DPN is conceived as being of, by, and for the academy. As such, it is a direct response to the "growing need to preserve digital assets that represent the intellectual capital of scientific disciplines [and] educational communities" that served as the point of departure for this editorial.

Reference

1. Frank Gens, "Top 10 Predictions: IDC Predictions 2012: Competing for 2020," accessed April 29, 2013, <http://cdn.idc.com/research/Predictions12/Main/downloads/IDCTOP10Predictions2012.pdf>.

Administrative Metadata for Long-Term Preservation and Management of Resources

A Survey of Current Practices in ARL Libraries

Jane Johnson Otto

An institutional repository is, among other things, a means to preserve an organization's scholarly output or resources in a variety of digital media and across disciplines. Administrative metadata are critical to the preservation of these digital resources. This study, which surveyed fifty-four Association of Research Libraries (ARL) institutional repositories about their administrative metadata, was designed to create a snapshot of current metadata practices. It revealed no true consensus of administrative metadata accommodated and collected by the repositories. Moreover, responses throughout the survey indicate that in general, organizations are neither accommodating nor recording administrative metadata to any significant extent. If research libraries are to provide permanent, organized, and secure repositories for institutional scholarship and special collections, they must identify core metadata in the context of repository objectives, explore barriers to collection of administrative metadata, and strategize as to how those barriers might be mitigated or overcome.

An institutional repository is a central digital repository for an organization's scholarly output across media and disciplines. It is organized and secure, and the digital objects (scholarly resources) it houses are intended to be permanently preserved. A scan of Association of Research Libraries (ARL) repository websites shows that many libraries make explicit this "preservation promise" to depositors and other users.

Administrative metadata, which describes the technical characteristics of the digital file and any original physical source object, preservation actions, and relevant intellectual property rights and access permissions, is critical to the preservation of digital resources.¹ Ten years ago, early in the development of institutional repositories, lack of preservation and administrative metadata was cited as the biggest obstacle to successful long-term preservation.² Six years ago, the *Audit & Certification Criteria and Checklist* developed by the Research

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Libraries Group-National Archives and Records Administration (RLG-NARA) Task Force on Digital Repository Certification addressed metadata again, and suggested “preservation metadata is best addressed by members of the designated communities.”³

These communities have responded to the call by developing numerous standards to support the preservation and management of digital objects. A review of these standards reveals that administrative metadata are detailed and voluminous, and for good reason. Most librarians and archivists would agree that the more information that is known about a resource, the more effectively it can be managed and preserved. Unfortunately, the gathering, recording, and management of detailed metadata is expensive; indeed, a 2002 report by RLG stated that creation of detailed *technical* metadata alone was possibly beyond the human resources of most institutions.⁴ Ten years later, this is still the case.

To further complicate matters, the array of standards, best practices, and models fail to form a cohesive whole. As if the sheer volume of detailed administrative metadata were not daunting enough, the overlap and gaps between the related standards make them difficult to implement within any repository system. There are preservation metadata standards meant to apply to all formats but which lack the specificity needed for any one.⁵ There are technical metadata standards intended for a specific format but which lack corresponding metadata for the original (usually analog) source material.⁶ Those technical metadata standards that do include source metadata are often only applicable to one format.⁷ Moreover, boundaries between metadata types are not clearly delineated. Some preservation standards include rights metadata,⁸ but some do not. Finally, there are standards that were not designed to record detailed administrative metadata, but which have nonetheless been extensively used for this purpose.⁹

Within this complex landscape lives a community of institutions often overwhelmed by an influx of digital resources and struggling to balance the value added by metadata and the significant cost of that metadata's creation and maintenance. Individual institutions may have a good idea of how much metadata it is practical to record based on their individual circumstances; what the community needs is a clearer picture of what administrative metadata are critical to the preservation mission, particularly in the increasingly collaborative information space. As Chen and Reilly stated, “one of the biggest challenges in preservation automation is to develop a strategic preservation metadata plan *and decide how much information we need to record* and whether the information can be accurately recorded.”¹⁰ At this point it is unclear what metadata are actually being collected for repositories, or even what metadata these established repositories are able to support.

This paper provides the first snapshot of current

practices through a survey that identifies administrative metadata *accommodated* by ARL repositories and administrative metadata actually *collected* for those repositories. This study assumes that digital preservation requires administrative metadata and was designed to answer these questions:

1. What administrative metadata can repositories collect (given their current schemas?)
2. How many administrative metadata are actually being collected?
3. What are the common elements of administrative metadata collected across a majority of ARL institutional repositories?
4. Is the metadata perceived to be sufficient to support the tasks a repository is expected to perform?

The survey was designed to determine the extent to which repositories are able to accommodate robust administrative metadata, and the degree to which organizations are collecting it. Responses should help identify any gaps between metadata currently (or commonly) collected and metadata needed to support digital preservation. It is hoped that survey results will inform discussions of the current state of digital preservation, and ways to move forward.

Literature Review

Digital preservation has been identified as a primary attribute and responsibility of the trusted repository in numerous seminal publications, notably the 2002 RLG-OCLC report on trusted digital repositories,¹¹ Clifford Lynch's 2003 article on institutional repositories (IRs),¹² the 2003 Joint Information Systems Committee (JISC) report on e-prints preservation,¹³ the 2006 Nestor Working Group *Catalogue of Criteria for Trusted Digital Repositories*,¹⁴ and the 2007 RLG-NARA *Audit & Certification Criteria and Checklist*.¹⁵ Several studies suggest digital preservation is valued by libraries, repository contributors, and users.¹⁶

These publications notwithstanding, the professional literature still suggests that repositories and librarians are unprepared to preserve their digital objects and, for the most part, have not yet done so. Ten years ago, the 2003 *Invest to Save* report enumerated the “severe limitations” to digital preservation methods, processes, strategies, systems and technologies, warning of “great risk that valuable digital content will not survive for the long term.”¹⁷ The 2003 JISC report on e-prints preservation described the field in a state of flux and uncertainty; repository managers had yet to engage fully with preservation challenges and were “unsure of how to proceed.” This uncertainty was echoed several years later in responses to the 2006 *Census of Institutional Repositories in the United States*.¹⁸ Ross in 2003 found that

few organizations were actively developing digital preservation solutions, preservation models tended to be reactive and ad hoc, and few organizations seemed aware of the complexities with migration or the enormity of the preservation problem.¹⁹ In 2005 Knight listed a number of “significant concerns as to how a sustainable outcome will be achieved in this arena,” including low-level awareness of need and a lack of metrics (regarding the scope of the challenge), skill sets, agreed upon approaches, practical models, and collaboration.²⁰ A 2006 Canadian Association of Research Libraries (CARL) institutional repository assessment questioned whether surveyed repositories possessed sufficient resources and expertise to follow through on their posted preservation policies;²¹ that same year, a study of repository websites found virtually no evidence of long-term preservation plans.²² Digital Preservation Europe’s (DPE) 2007 Research Roadmap pointed to a lack of systematic approach to preservation, “no common understanding of the precise definition of digital preservation,” and a “lack of adequate knowledge transfer.”²³ An additional factor is cost. Several authors have noted the difficulty of predicting preservation costs,²⁴ but from the outset it has been clear that digital preservation requires a steady long-term commitment of resources.²⁵

Most of these issues apply equally to the creation and maintenance of the administrative metadata that supports the digital preservation process. Although metadata are just one component of this process, their role is a critical one. The 2003 JISC report called preservation metadata the blueprint for the preservation strategy, and provided ample justification for all types of administrative metadata.²⁶ Knight cited a “genuine uncertainty as to when preservation metadata is to be captured, how it will be captured, who updates it, and when.”²⁷ Alemneh’s research indicates that the most frequently identified barriers to the adoption of PREservation Metadata: Implementation Strategies (PREMIS) include lack of training and expertise and perceived lack of knowledge necessary to be confident in the ability to implement PREMIS.²⁸ Caplan has noted that preservation metadata are not simple to understand, obtain, or implement, and characterizes preservation metadata as “a repository’s best guess” as to the information needed to enable use of a resource into the future.²⁹ Dappert and Enders describe the complexities associated with standard schemas and the difficulty of striking “the right balance between generality and specificity.”³⁰ Dappert and Farquahar (2009) assert that current metadata dictionaries are still vague and “await increased practical experience to establish the proper level of granularity.”³¹ Again, there is the issue of cost. Metadata has been called “one of the most costly aspects of digital preservation.”³² Metadata extraction tools show promise, but only limited categories of preservation metadata can be extracted, and comparative analyses of the tools have revealed some shortcomings.³³

Given these barriers to effective metadata creation, and particularly given the concerns of metadata and digital preservation costs, it is surprising that there is virtually no data about what, or even how many, administrative metadata are actually being collected, to determine how that metadata supports the preservation aspect of the repository mission. Most surveys on repository metadata concern descriptive metadata, or discuss metadata generally, without delving into the specifics of administrative metadata.³⁴ Li and Banach surveyed ARL libraries about digital preservation of institutional repository materials, but asked broader questions of policies, strategies, rights, content quality, and sustainability. In ARL’s own spec kit on digital preservation, metadata questions were general and few.³⁵

A better picture of actual repository capabilities and practices should yield more concrete answers to questions of digital preservation cost and the ability of current practices to support the preservation mission. Related questions about staffing, preservation tasks supported by the metadata, and perceptions of the metadata’s adequacy, could shed light on other issues raised in the literature. Finally, it was hoped that the survey might reveal commonalities that could stimulate discussion about guidelines and collaborative uses for administrative metadata, to promote the longevity of digital collections.

Method

Assessing the value of any particular type of metadata is impossible without knowing the mission of the repository. Therefore considerable preliminary research was conducted on two fronts: (1) to identify and define discrete categories of metadata and individual elements belonging to each metadata type and (2) to identify and distill into a single list the multitude of preservation-related tasks considered important for digital repositories, as established in the literature. This knowledge guided formulation of the survey questions and the response options. The survey was drafted using SurveyMonkey; an Institutional Review Board (IRB) waiver was obtained, and the survey was tested and timed by a number of colleagues nationwide.

ARL is a nonprofit organization of 126 libraries at comprehensive, research-extensive institutions in the United States and Canada, which share similar missions, aspirations, and achievements. Participation was limited to these libraries to provide a focused and representative sample of research organizations which host digital repositories and that generally work collaboratively to preserve and make available the scholarly record.

Repository contacts making up the survey sample were drawn from the Registry of Open Access Repositories (ROAR) and the Directory of Open Access Repositories

(OpenDoar),³⁶ as well as from the institutions' websites. Participants were asked to provide a single institutional response. If an organization had more than one repository, the participant was asked for a response pertaining to "your primary repository, the one housing your organization's scholarship, and/or digital collections, i.e., the one most aligned with your institutional mission." Those organizations hosting a consortial repository were asked to coordinate a single response from a representative of that repository.

In May 2012, 104 survey invitations were sent and fifty-five complete responses were received. Of these, one response represented a repository still under development for which metadata had not yet been finalized, and that survey response was excluded from the resulting data set for a completion rate of 52 percent of the sample.

The Survey

The confidential survey consisted of thirty-seven questions about the repository, its administrative metadata schema, individual metadata elements, and repository tasks that metadata support. "Metadata schema" refers to an organized and documented set of metadata elements. A schema may be internal to an organization or may represent a shared metadata standard, which is managed by a standards body and open to community review and reuse.

Because of the diversity of metadata standards and definitions, the scope of the questions were limited to four types of administrative metadata that directly impact preservation, defined as follows:

- Rights metadata: information about intellectual property rights granted or reserved, copyright holder or licensor, etc.
- Technical metadata: metadata describing the characteristics of the archival digital file, e.g., file size, compression scheme, operating system, codec, etc.
- Preservation metadata: metadata supporting the digital preservation process, beyond that found in technical metadata
- Source metadata: metadata documenting the physical characteristics of the original (usually analog) physical source object from which the digital master is derived (for example, an original film negative or vinyl record), e.g., dimensions, sound and color characteristics, etc.

Respondents were asked a series of questions for each metadata type: rights, technical, preservation, and source. For each type, it was first determined if the respondent's repository accommodated that type. If the answer was "yes," the respondent was asked several more questions pertaining

to that type of metadata. If the answer was "no," the respondent skipped forward to a similar series of questions for the next metadata type. The entire survey is appended to this paper.

Survey Results

The Repositories

Although repository names cannot be published because of IRB restrictions and agreements made with respondents, it can be said that 83 percent of the fifty-four respondents answered the survey either in terms of "the institutional repository" ("a repository of broad scope but limited to the organization's scholarly output") (41 percent) or in terms of a repository "combining scholarly output with digitized library archive collections" (43 percent). Thirteen percent of respondents answered questions in reference to "the organization's digital library, limited to digitized library or archive collections."³⁷ One respondent spoke on behalf of a consortial repository; another described her repository as a combination of digitized graduate theses and scholarly output of library (i.e., not university) faculty. Repositories were equally divided between small (fewer than 1,000 fully cataloged resources added annually), medium (1,000–5,000 added annually), and large (more than 5,000). The most heavily used repository software was DSpace, employed by thirty respondents (56 percent), followed by Fedora and custom/in-house applications (six institutions, or 11 percent, each).

Most of the surveyed organizations accommodated textual materials, still images, video, and audio. Nearly three-quarters accommodated data sets. Those checking the "other" box listed websites (four respondents), code or software (three), musical compositions (one), and "Encoded Archival Description (EAD) finding aids, MARC21 collection-level records, and PDF inventories linked to collection-level records."³⁸

Administrative Metadata Employed

Respondents were presented with a list of fifteen metadata standards and asked to check all from which they had incorporated any elements for rights, technical, source, or preservation metadata; additional standards could be specified under "other" (see table 1).³⁹

Twelve of these fifteen metadata standards, plus an additional twelve specified under "other" (for a total of twenty-four), were incorporated into the metadata schema of at least one repository.⁴⁰ The majority of respondents (59 percent) employed more than one metadata standard.⁴¹ On average, repositories combined two. One organization combined eleven standards, but twenty-two organizations (42

percent) used just one.

The three most heavily used metadata standards were Qualified Dublin Core (81 percent), Simple Dublin Core (43 percent), and Metadata Object Description Schema (MODS) (30 percent). Moreover, each of the twenty-two libraries employing just one standard used Dublin Core (most frequently, Qualified Dublin Core) or MODS.⁴² Ironically, each of these three standards was originally designed for descriptive metadata.

The range of metadata standards incorporated into any one repository's schema, and the spread across standards, suggests a lack of consensus regarding the viability of any one standard or series of standards.

Rights Metadata

Over three-quarters of repositories (forty-two, or 78 percent) accommodate some rights metadata. Of the twelve respondents whose repositories do not accommodate rights metadata, two indicated rights for their resources are known and fall into a single (or small number of) rights categories, suggesting the information could be kept in institutional memory. Another noted it tracks licenses for repository resources, but not via repository metadata.⁴³

Since in all probability, different metadata are recorded for different types of objects and formats (faculty scholarship, research data, video, etc.), it was not practical to ask respondents exactly what metadata are routinely recorded across all types of repository objects. Therefore the survey asked which metadata elements are *accommodated by the repository schema*, and as a corollary, for what portion of the repository objects (roughly) is *some* of that metadata actually recorded.

Respondents were presented with a list of eighteen rights elements and asked to check those accommodated by their repository metadata schema (see figure 1). (It is important to keep in mind throughout the survey that respondents were directed to select an element from the list only if their metadata schema "has an element dedicated to that information, or a more granular form of it." When a respondent left a metadata element unchecked, it does not mean that metadata cannot be recorded in the repository; it simply means there is no element *dedicated* to that metadata. In other words, the metadata are not sufficiently parsed to allow efficient retrieval, machine processing, reporting, and sharing.)

Every element offered on the list was used by at least two repositories. The average number of rights elements accommodated was 4.6. The four most common are

1. rights statement or license terms (general) (90 percent);
2. copyright status (e.g., copyright protected, public domain) (57 percent);
3. rights granted the repository (replicate, migrate, modify, use, delete, etc.) (48 percent); and

Table 1. Administrative Metadata Standards Incorporated into Repository Metadata

Rank	Standard	No. of Respondents
1	Qualified Dublin Core	43
2	Simple Dublin Core	23
3	MODS	16
4	PREMIS	11
5	NISO MIX (Z39.87)	10
6	MARC	9
	Other	23

4. availability status (e.g., open, restricted, unavailable) (36 percent).

Respondents were then asked to specify the portion of the repository's objects for which rights metadata are actually recorded (see figure 2). Of the forty respondents whose repositories accommodate some rights metadata and who were able to answer this question (two respondents responded "I don't know"), sixteen (40 percent) said they record some of this rights metadata for all of their repository objects. Eight respondents (20 percent) record some of this rights metadata for less than one third of their repository objects, and one of those eight respondents records no rights metadata at all. When all respondents are taken into account, nearly a quarter of repositories (thirteen, or 25 percent) record no rights metadata.⁴⁴ Clearly, only a relatively small percentage of repositories are routinely recording sufficient rights metadata.

Next, respondents were asked to gauge their satisfaction with the amount of rights metadata that can be collected (i.e., the number of elements accommodated by the repository) and the amount that actually is collected (see figure 3). Each response on the scale was assigned a value from one (way too little) to five (way too much), with intermediate values of two, three (just right), and four. "I don't know" had a rating of zero. ("I don't know" responses were discarded for this question and others where it could skew results.) Rights metadata capability ("rights metadata you CAN collect") had a higher rating average (2.66) than actual rights metadata practice ("rights metadata you DO (routinely) collect") (2.23).

Thirty-eight respondents assessed the amount of rights metadata the repository can accommodate. Of those, twenty-one (55 percent) felt the amount of metadata accommodated by their schema is "just right." In terms of actual practice, only seventeen respondents (42 percent) felt the amount of metadata they routinely collect is "just right." Well over half the respondents (twenty-three, or 57 percent) felt the metadata they routinely collect falls on the (less

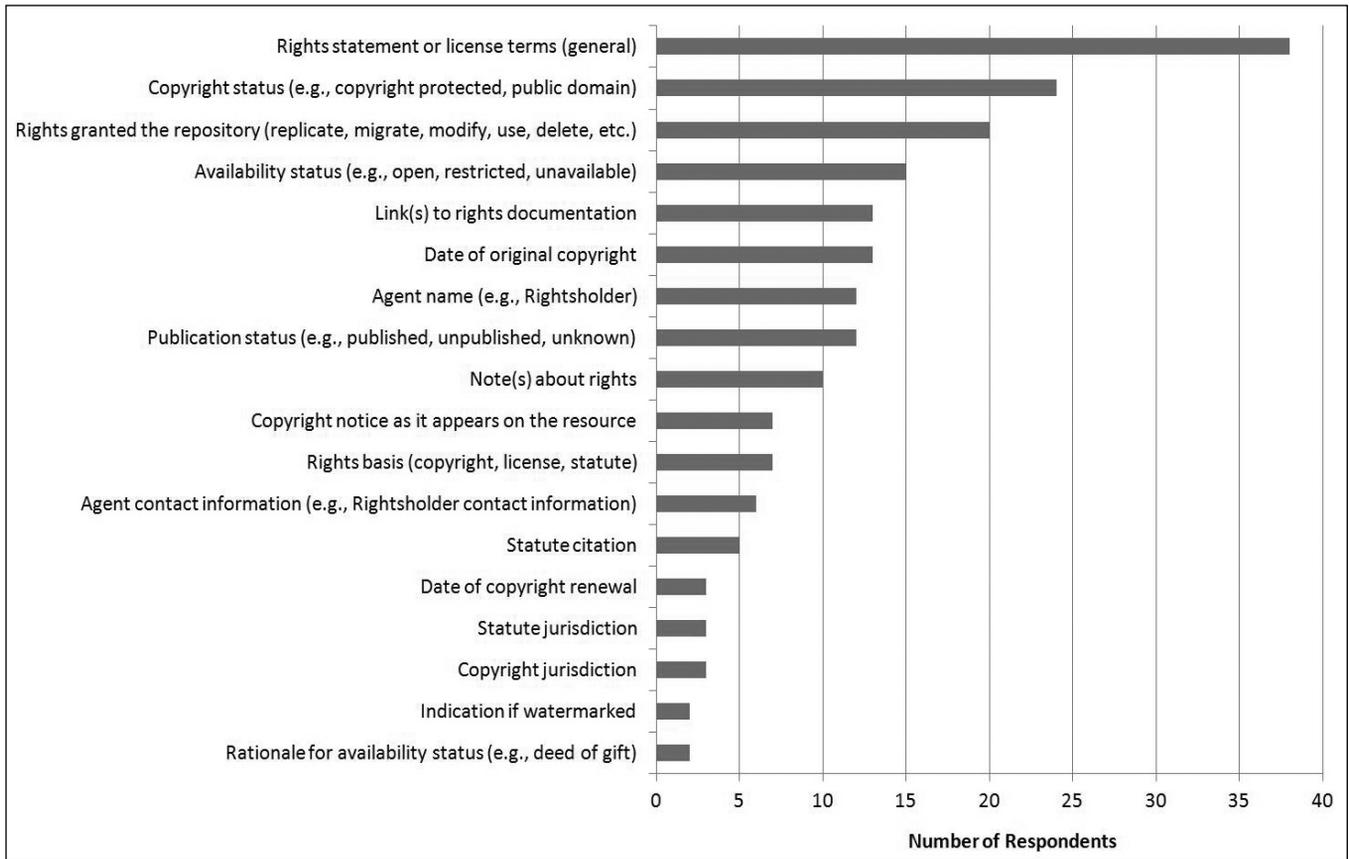


Figure 1. Rights Metadata Elements Accommodated

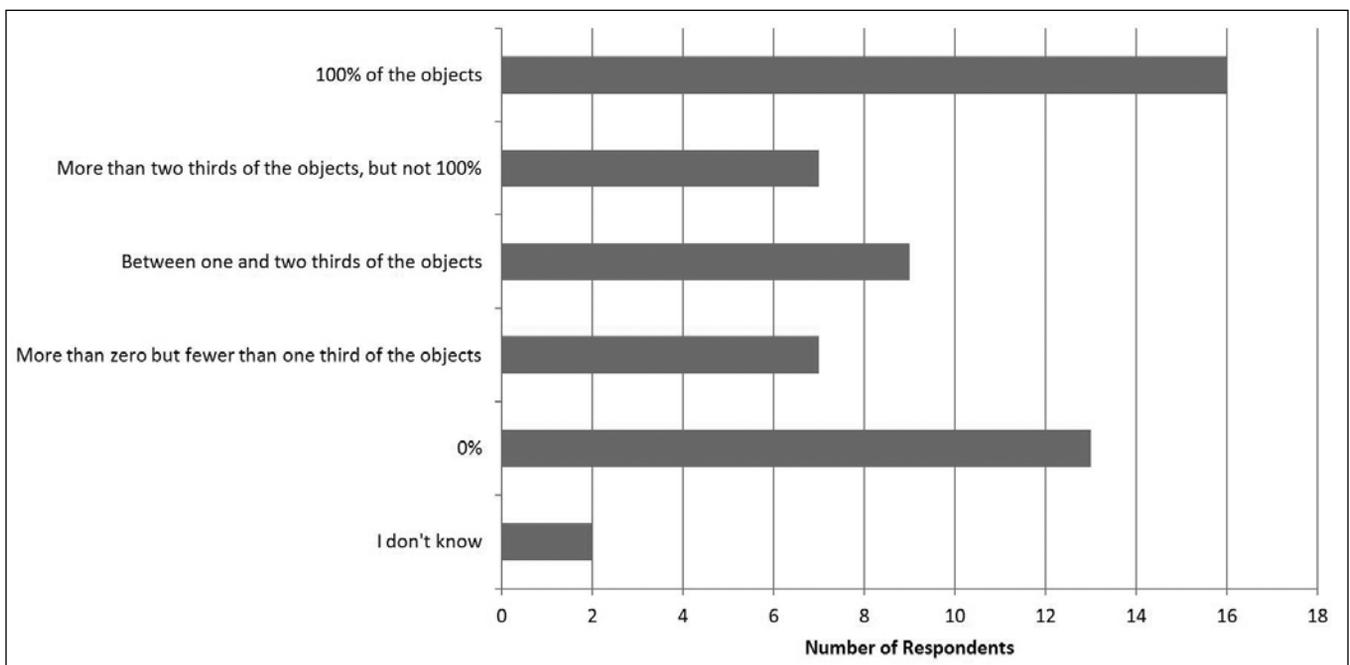


Figure 2. Portion of Repository Objects For which Some of This Rights Metadata is Recorded? (includes repositories that do not accommodate rights metadata)

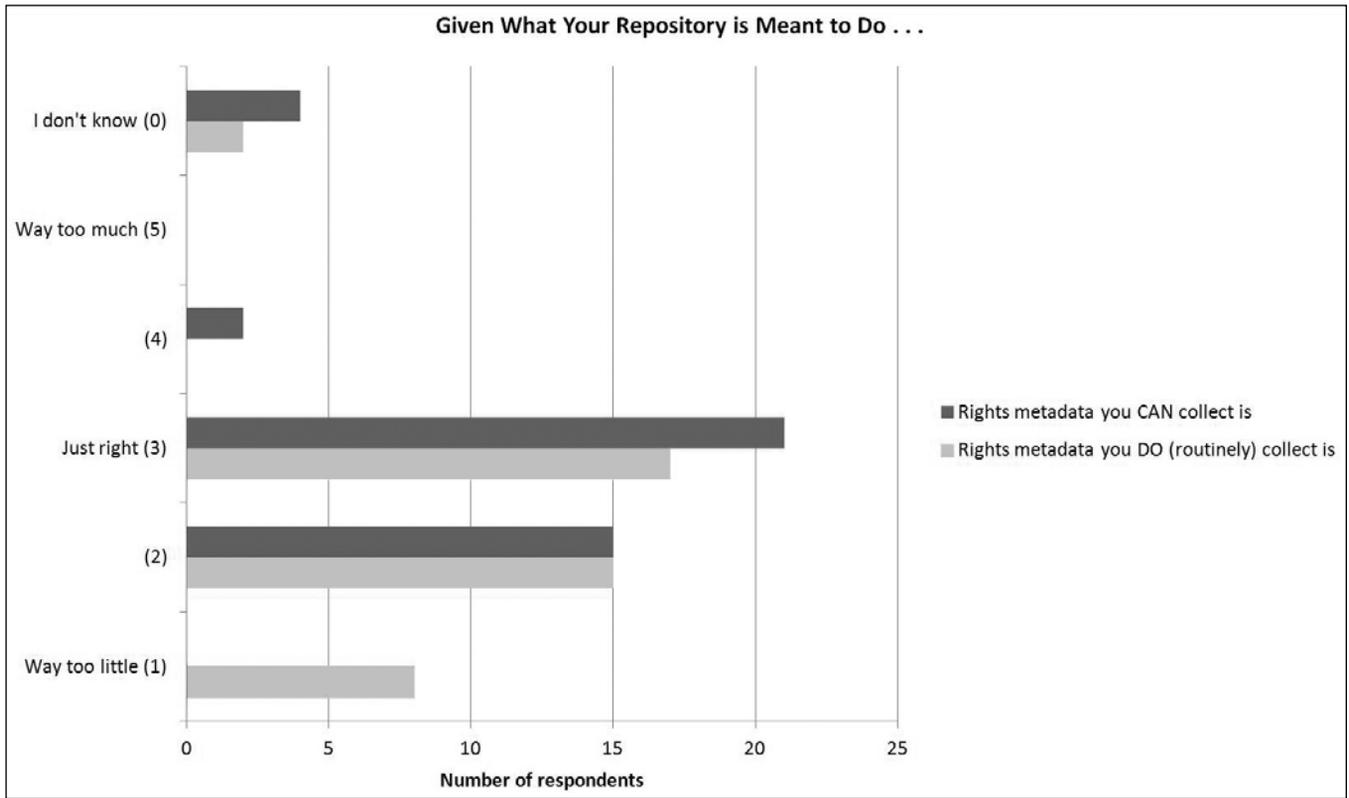


Figure 3. Rights Metadata Capability Compared to Rights Metadata Practice

Table 2. Ratings of Rights Metadata Capability

Rights Metadata You Can Collect Is . . .						
No. of Elements Accommodated by the Repository	1 "Way Too Little"	2	3 "Just Right"	4	5 "Way Too Much"	0 "Don't Know"
1 (7 respondents)	0	4	3	0	0	0
2 (6 respondents)	0	4	2	0	0	0
3 (7 respondents)	0	5	2	0	0	1
4-5 (6 respondents)	0	2	4	0	0	2
6-8 (6 respondents)	0	2	4	0	0	0
9+ (6 respondents)	0	0	5	1	0	2
Total	0	17	20	1	0	5

than) “just right” end of the scale, with eight (20 percent) saying the amount was “way too little.”

Survey responses were also reviewed individually to identify (1) how many respondents perceived a gap (in terms of adequacy) between metadata accommodated and metadata routinely supplied, and (2) the size of that gap. For 64 percent of respondents, there was no gap. Twenty-five percent of respondents had a gap of one rating point, and 11 percent had a gap of two rating points.

Finally, data were analyzed to determine whether the

rating for a repository’s rights metadata *capability* correlated to the number of metadata elements the schema accommodates (as derived from question 12). Respondents were divided into groups of roughly equal size based on the number of metadata elements accommodated, and ratings were compared for each category (see table 2).

In general, the more metadata elements a schema accommodates, the more likely respondents are to rate the metadata they *can* collect as 3 (“just right”) or 4 (somewhere between “just right” and “way too much”) (see figure 4).

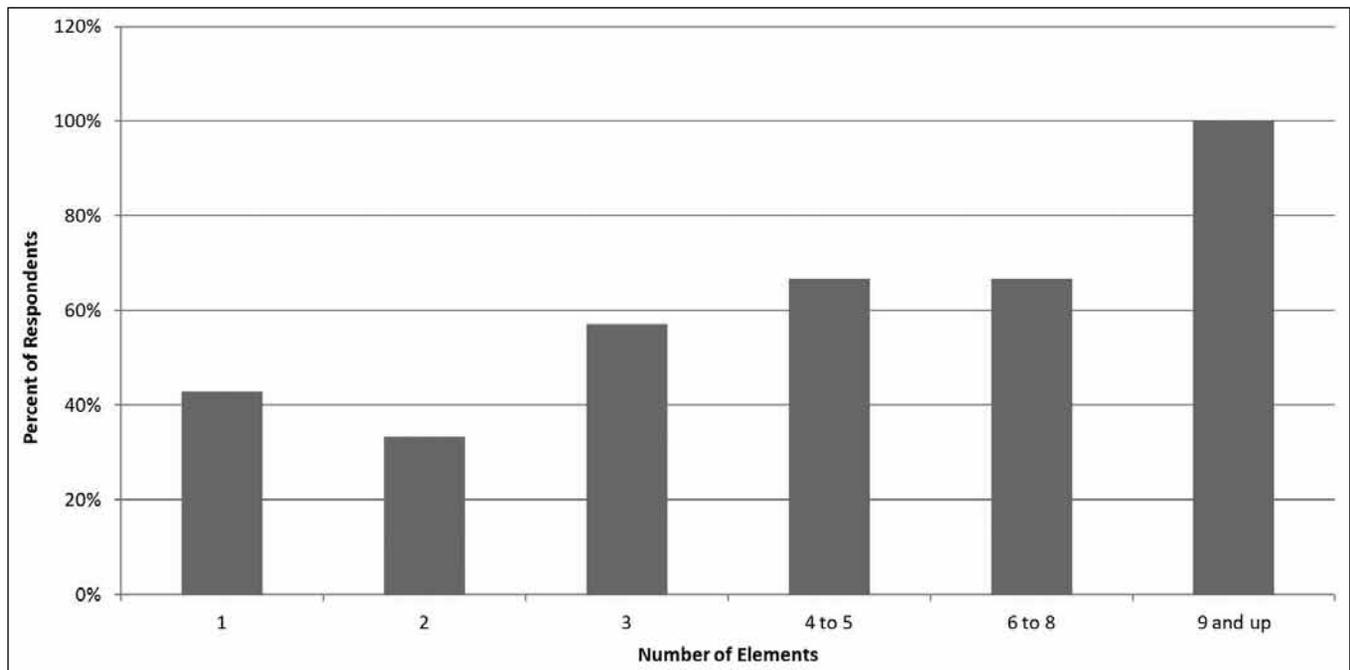


Figure 4. Percent of Respondents Rating Rights Metadata 3 (“just right”) or higher (1 = way too little; 3 = just right; 5 = way too much)

Table 3. Rating of Rights Metadata Capability Relative to Number of Rights Elements Accommodated

Rights Metadata You Can Collect Is . . .			
Rating	No. of Respondents with This Rating	No. of Elements Accommodated by Repositories with this Rating	Avg. No. of Elements Accommodated by Repository with this Rating
1 (way too little)	0	n/a	n/a
2	15	1-8	2.87
3 (just right)	21	1-18	5.57
4	2	3 and 13	8
5 (way too much)	0	n/a	n/a
Don't know	4	3-12	6.25

Those schemas with the most elements (9–12) were rated 3 or higher by 100 percent of respondents, whereas schemas with the least elements (1) were rated 3 or higher by only 43 percent of respondents.

Interestingly, there appears to be no consensus as to how many elements would warrant a “just right” rating (see table 3). For the twenty-one who rated the repository capability “just right,” the number of elements ranged from one at one end of the spectrum to eighteen at the other end. The disparities found in responses to this question, together with the relatively high percentage of “I don’t know” responses (11 percent), indicate there is little consensus as to how much is too much rights metadata, and how much is too little.

Technical Metadata

Forty-three repositories (80 percent) accommodate some technical metadata (roughly equivalent to the percentage of repositories accommodating some rights metadata). Of the eleven respondents whose repositories do not accommodate technical metadata, one noted “so far the vast majority of materials are PDFs” (suggesting the technical metadata could be kept in memory), and another noted that technical information can be added in a separate document and attached.

Respondents were presented with a list of thirteen technical metadata elements and asked to check those accommodated by their repository metadata schema (see figure 5). Every element offered on the list was used by at least one

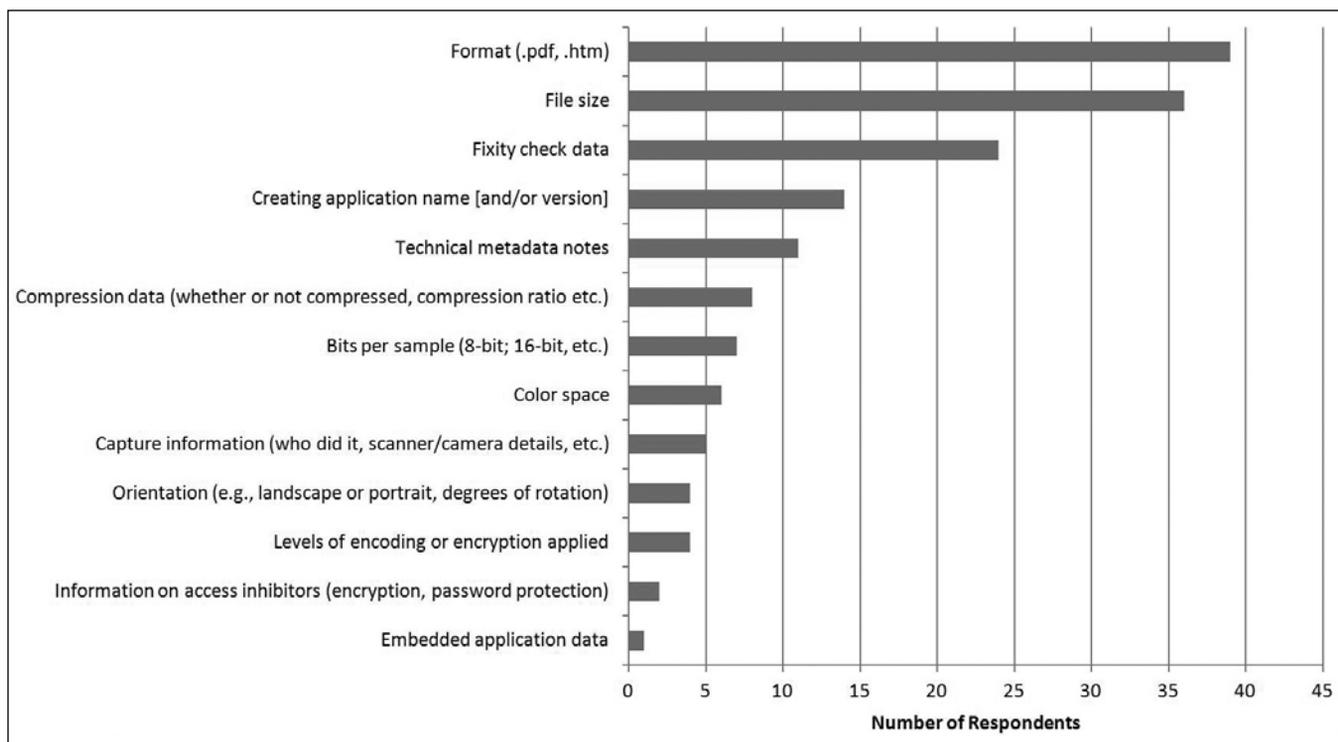


Figure 5. Technical Metadata Elements Accommodated

repository. The average number of technical metadata elements accommodated was 3.9.⁴⁵ The five most common are

1. format (.pdf, .htm) (98 percent);
2. file size (88 percent);
3. fixity check data (56 percent);
4. creating application name [and/or version] (34 percent); and
5. technical metadata notes (27 percent).

Respondents were next presented with a list of fifteen technical metadata elements specific to video and asked to check those accommodated by their repository metadata schema (see figure 6). Of forty-three respondents offered this question, thirty-seven (86 percent) accept video in their repositories, yet twenty-two of those (51 percent) answered “none of the above” or some equivalent. In fact, taking all surveyed repositories into account, 48 (89 percent) accept video, yet only seventeen of those (35 percent) accommodate video technical metadata. Therefore responses to this question (or lack thereof) may say more about the dearth of video metadata than about what metadata are considered useful. Each of the fifteen metadata elements listed was nonetheless accommodated by at least one, and as many as thirteen, repositories.

Respondents were then presented with a list of eleven

technical metadata elements specific to audio and asked to check those accommodated by their repository metadata schema (see figure 7). Of forty-three respondents who were offered this question, thirty-eight (88 percent) accept audio in their repositories, yet nearly half of those (eighteen, or 47 percent) answered “none of the above” or some equivalent. Taking all surveyed repositories into account, forty-seven (87 percent) accept audio, yet only eighteen of those (38 percent) accommodate audio technical metadata. Again, responses to this question reveal more about the dearth of audio metadata than about what metadata are considered most useful. Still, each of the eleven metadata elements listed was accommodated by at least two, and as many as fourteen, repositories.

Respondents were asked about the portion of the repository’s objects for which technical metadata are actually recorded (see figure 8). Of the thirty-eight respondents whose repositories accommodate some technical metadata and who were able to answer this question, twenty (53 percent) record some of this technical metadata for all of their repository objects. When all respondents are taken into account however, nearly a third of repositories (fifteen, or 31 percent) record no technical metadata.

Respondents were then asked to gauge their satisfaction with the amount of technical metadata that can be collected and the amount that actually is collected (see figure 9).

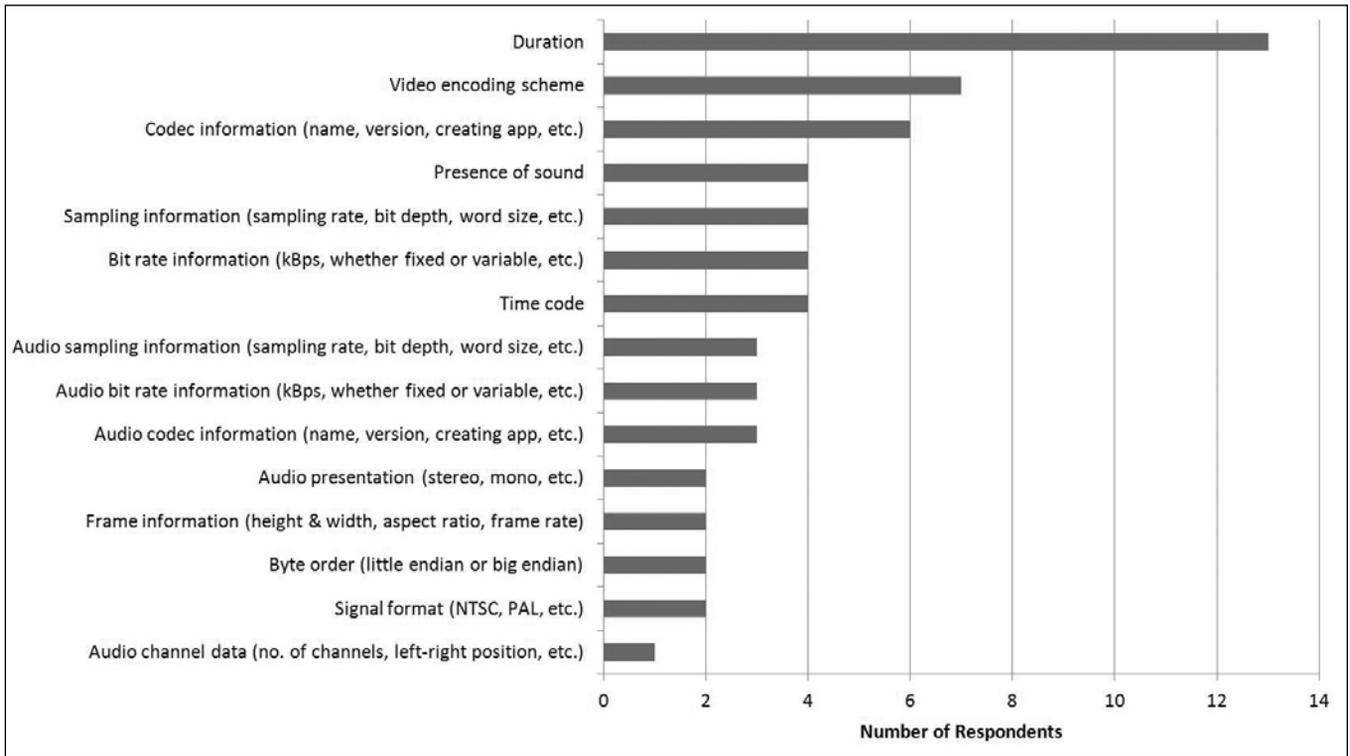


Figure 6. Technical Metadata Elements for Video Accommodated

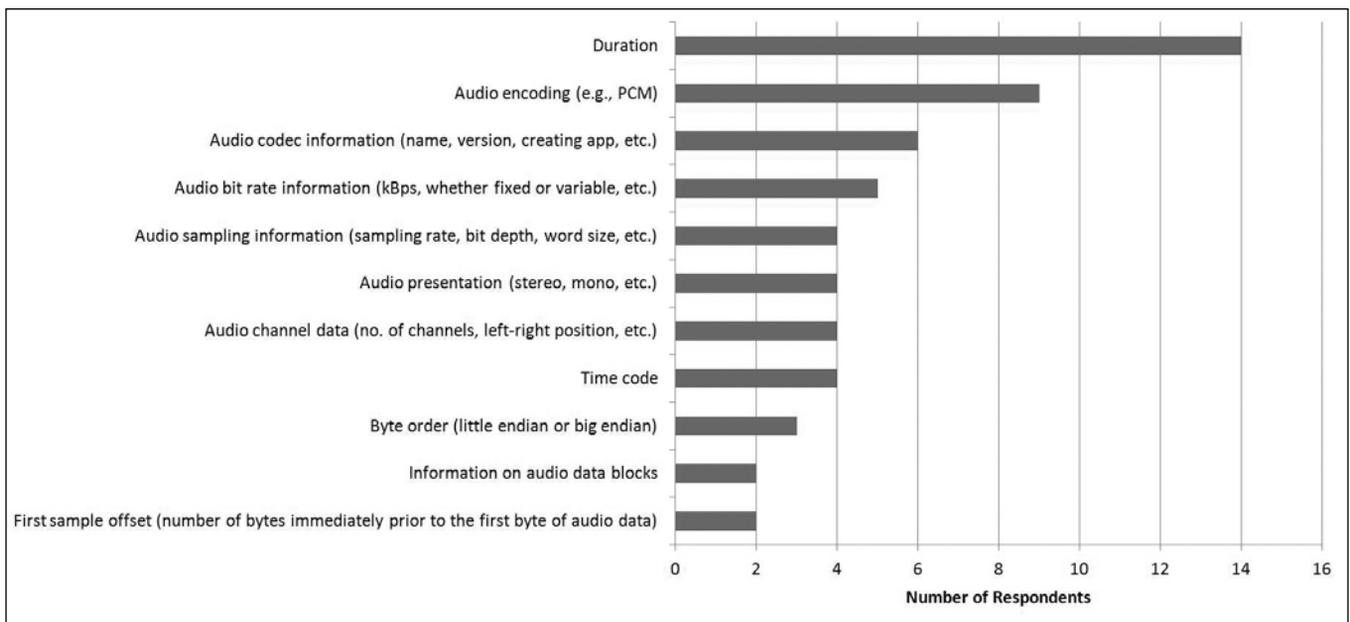


Figure 7. Technical Metadata Elements for Audio Accommodated

Similar to the results with rights metadata, repository capability (“technical metadata you CAN collect”) had a higher rating average (2.43) than actual technical metadata practice (“technical metadata you DO collect”) (1.95).

Forty respondents assessed the amount of technical metadata the repository can accommodate. Of those, sixteen (40 percent) felt the amount of metadata accommodated by their schema is “just right.” In terms of actual practice, only

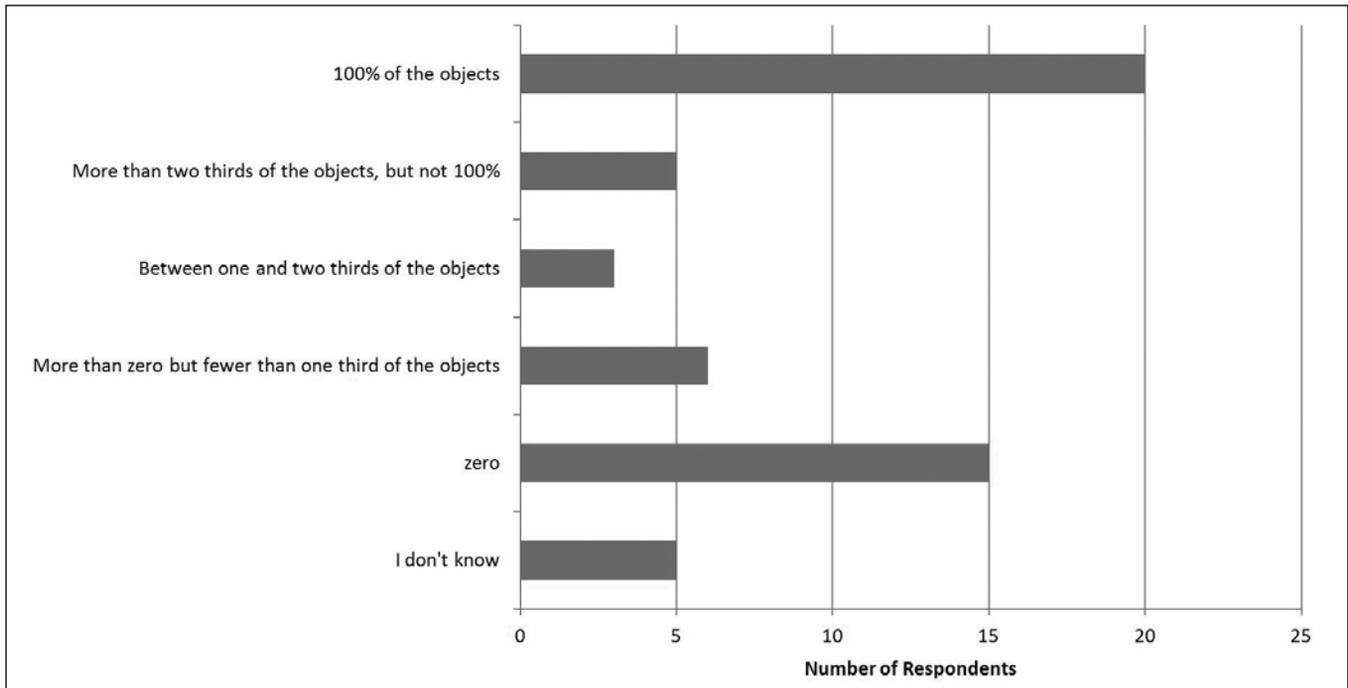


Figure 8. Portion of Repository Objects for Which Some of this Technical Metadata is Recorded (includes repositories that do not accommodate technical metadata)

ten (25 percent) felt the amount of metadata they routinely collect is “just right”; 35 percent felt the amount was “way too little.”

Survey responses were again reviewed one-by-one to determine frequency and size of any gaps between technical metadata accommodated and technical metadata routinely recorded. For 69 percent of respondents, there was no gap.⁴⁶ Nine percent had a gap of one rating point; 20 percent had a gap of two rating points; 3 percent had a gap of three rating points.

Finally, data were analyzed to determine whether the rating for a repository’s technical metadata *capability* correlated to the number of metadata elements the schema accommodates (as derived from question 16). Respondents were divided into groups of roughly equal size, based on the number of metadata elements accommodated, and ratings were compared for each category (see table 4).

In general, the more metadata elements a schema accommodates, the more likely respondents are to rate the metadata they *can* collect as 3 (“just right”) or 4 (somewhere between “just right” and “way too much”) (see table 5).

However, there appears to be no consensus as to how many elements would warrant a “just right” rating (see table 6). For the twenty-one respondents who rated the repository capability “just right,”⁴⁷ the number of elements ranged from just one at one end of the spectrum to ten at the other end.

Preservation Metadata

Just over half of the surveyed repositories (28 of 54, or 52 percent) accommodate some preservation metadata.⁴⁸

Respondents were presented with a list of thirteen preservation elements and asked to check those accommodated by their repository metadata schema (see figure 10).⁴⁹ Every element offered on the list was used by at least one repository. The average number of preservation elements accommodated was 3.5. The three most common are

1. storage location (file location; location scheme, e.g., handle, URI; storage medium, e.g., hard disc, magnetic tape, etc.) (63 percent);
2. links between objects when one is derived from the other (37 percent); and
3. preservation level (bit-level, full, etc.) (33 percent).

Respondents were asked about the portion of the repository’s objects for which preservation metadata are actually recorded (see figure 11). Of the twenty-six respondents whose repositories accommodate some preservation metadata and who were able to answer this question, twenty-one (81 percent) record some of this preservation metadata for all their repository objects.

Given that three of the respondents presented with this question do not actually record any of this preservation metadata, it can be said that of all fifty-four survey

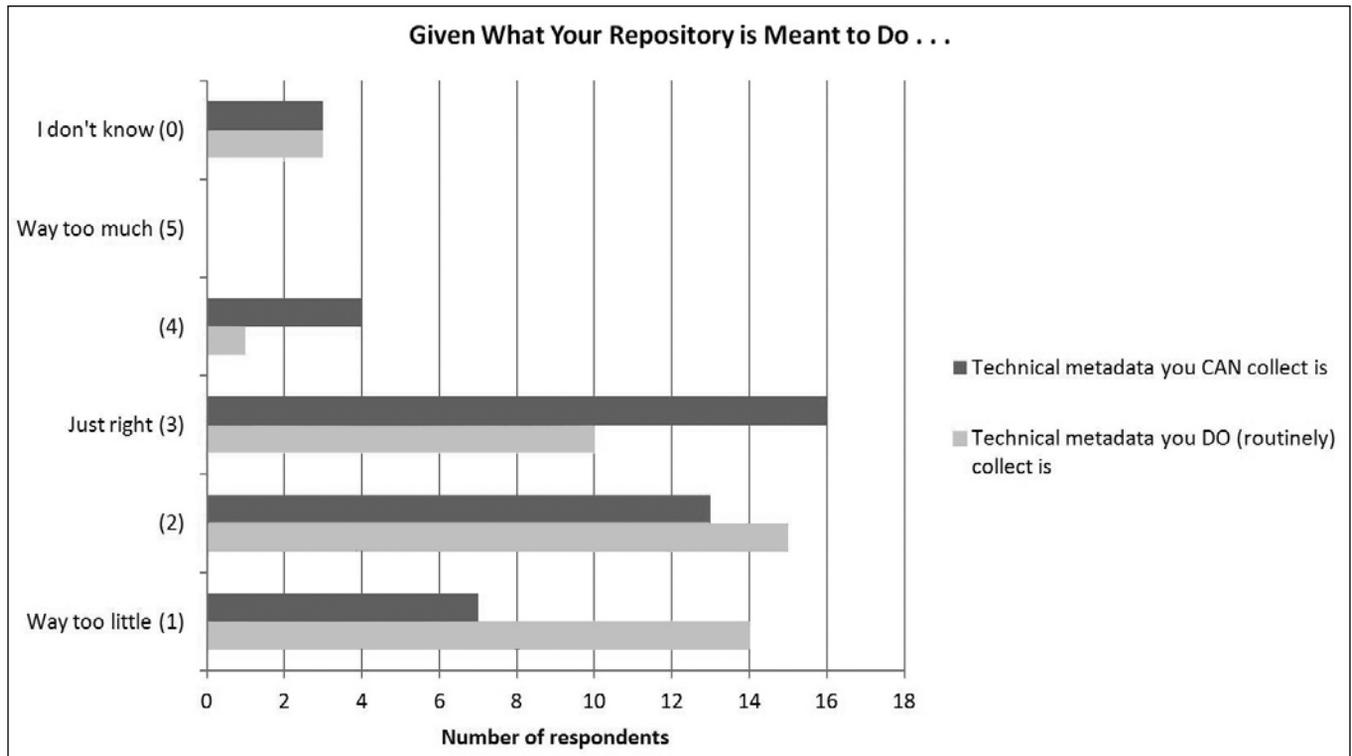


Figure 9. Technical Metadata Capability Compared to Technical Metadata Practice

Table 4. Ratings of Technical Metadata Capability

Technical Metadata You Can Collect Is . . .						
No. of Elements Accommodated by the Repository	1 "Way Too Little"	2	3 "Just Right"	4	5 "Way Too Much"	0 "Don't Know"
3 (12 respondents)	2	4	4	1	0	1
4 (8 respondents)	1	3	4	0	0	0
5–11 (9 respondents)	0	2	3	3	0	1
Total	7	12	15	4	0	3

respondents, exactly half record no preservation metadata at all.

Respondents were next asked to gauge their satisfaction with the amount of preservation metadata that can be collected and the amount that actually is collected. Preservation metadata capability (“preservation metadata you CAN collect”) had a higher rating average (2.48) than actual preservation metadata practice (“preservation metadata you DO (routinely) collect”) (2.0).

Twenty-five respondents assessed the amount of preservation metadata the repository can accommodate. Of those, eight (32 percent) felt the amount of metadata accommodated by their schema is “just right.”

In terms of actual practice, twenty-seven respondents made the assessment and eight of those (30 percent) felt

Table 5. Percent of Respondents Rating Technical Metadata 3 (“Just Right”) or Higher (1 = way too little; 3 = just right; 5 = way too much)

No. of Elements	No. of Respondents Rating 3 or Higher	% of Respondents Rating 3 or Higher
1–2 (12 respondents)	4	33
3 (12 respondents)	5	42
4 (8 respondents)	4	50
5–11 (9 respondents)	6	66

the amount of metadata they routinely collect is “just right.”

Survey responses were again reviewed individually to determine frequency and size of any gaps between metadata

Table 6. Rating of Technical Metadata Capability Relative to Number of Technical Metadata Elements Accommodated

Rating	No. of Respondents with this Rating	No. of Elements Accommodated by Repositories with this Rating	Avg. No. of Elements Accommodated by Repository with this Rating
1 (way too little)	7	2-4	2.6
2	12 [°]	2-8	3.8
3 (just right)	15 ^{°°}	1-10	3.9
4	4	3-11	7
5 (way too much)	0	n/a	n/a
Don't know	3	1-7	3.7

[°] One of the 13 who assigned this rating failed to specify the metadata elements accommodated by the repository, so that respondent's response was omitted from these data.

^{°°} One of the 16 who assigned this rating failed to specify the metadata elements accommodated by the repository, so that respondent's response was omitted from these data.

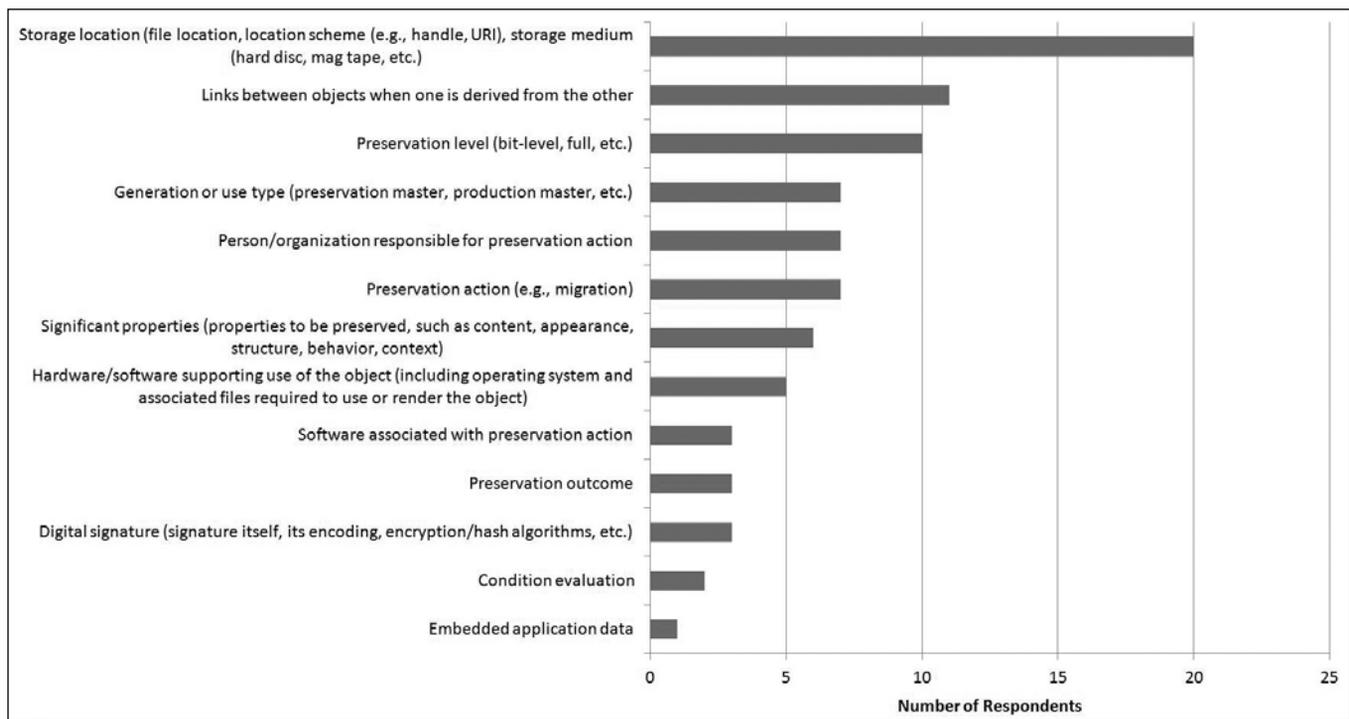


Figure 10. Preservation Metadata Elements Accommodated

accommodated and metadata routinely recorded. For 68 percent of respondents, there was no gap; 4 percent had a gap of one rating point; 11 percent had a gap of two rating points; and 4 percent had a gap of four rating points.

Finally, data were analyzed to determine whether the rating for a repository's preservation metadata *capability* correlated to the number of metadata elements the schema accommodates (as derived from question 23). Respondents were divided into groups of roughly equal size, based on the number of metadata elements accommodated, and ratings were compared by category (see table 7).

In general, the more metadata elements a schema accommodates, the more likely respondents are to rate the metadata they *can* collect between 3 (“just right”) and 5 (“way too much”) (see table 8).

As before, however, there appears to be no consensus as to how many elements would warrant a “just right” rating (see table 9). The number of elements rated “just right” (3) ranged from one to eleven; those rated somewhat below that (2) were in a similar range.

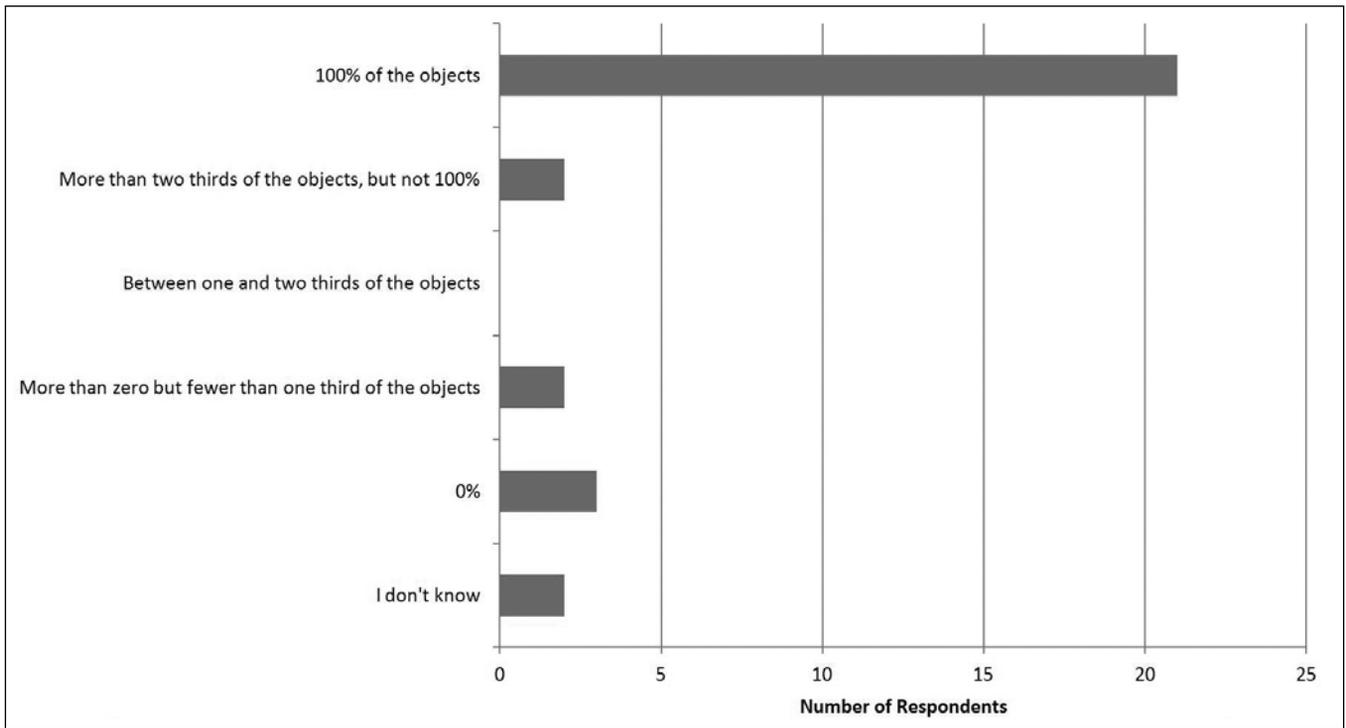


Figure 11. Portion of Repository Objects for Which Some of This Preservation Metadata is Recorded (includes repositories that do not accommodate preservation metadata)

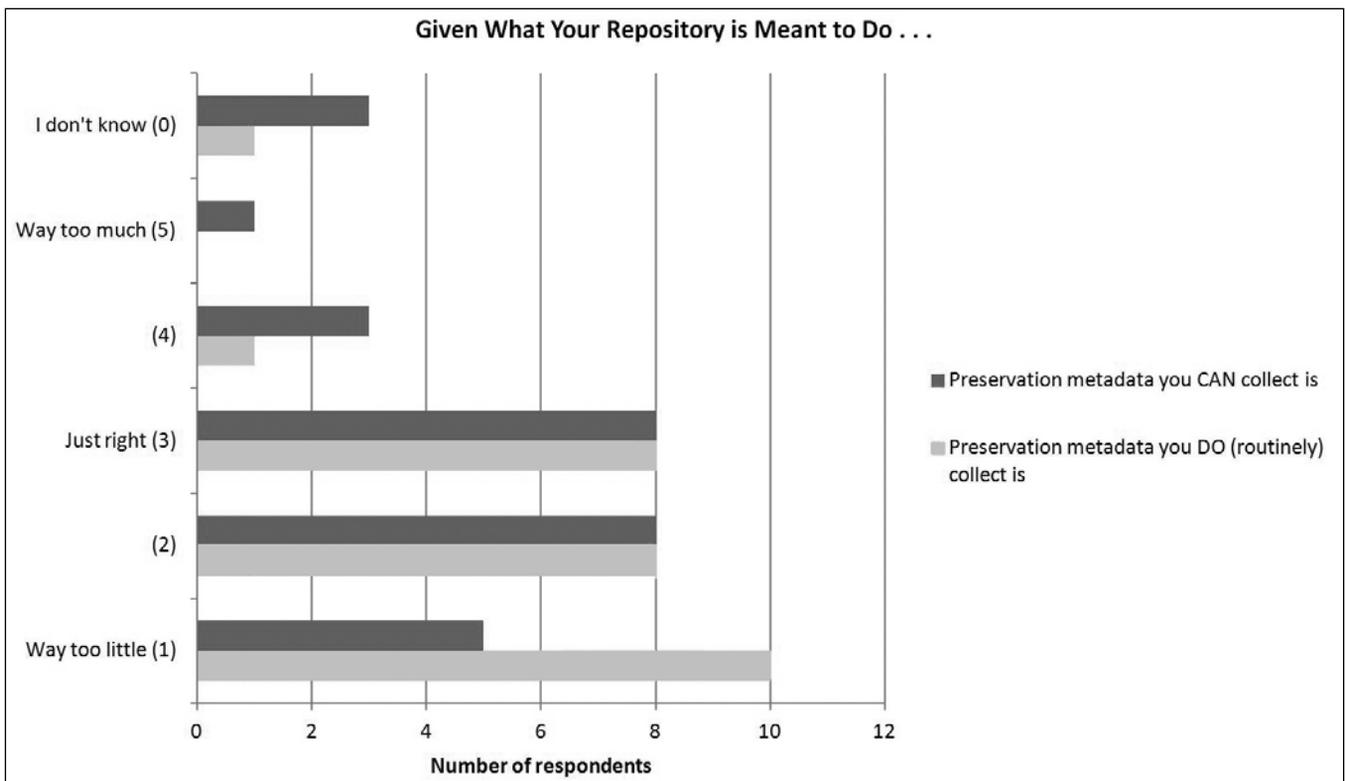


Figure 12. Preservation Metadata Capability Compared to Preservation Metadata Practice

Table 7. Ratings of Preservation Metadata Capability

Preservation Metadata You Can Collect Is . . .						
No. of Elements Accommodated by the Repository	1 "Way Too Little"	2	3 "Just Right"	4	5 "Way Too Much"	6 "Don't Know"
2–3 (7 respondents)	0	3	1	0	1	2
4–11 (9 respondents)	0	2	3	3	0	1

Table 8. Percent of Respondents Rating Preservation Metadata 3 ("just right") or Higher (1 = way too little; 3 = just right; 5 = way too much)

No. of Elements	No. of Respondents Rating 3 or Higher	% of Respondents Rating 3 or Higher
1 (8 respondents)	2	25
2–3 (7 respondents)	2	29
4–11 (9 respondents)	6	66

Source Metadata

Respondents whose repositories accommodate source metadata were asked only the broad categories of source metadata accommodated (physical characteristics, provenance, physical location), and the percentage of applicable resources to which the source metadata was actually applied. Over half of surveyed repositories (twenty-nine of fifty-four, or 54 percent) accommodate some source metadata.

Respondents were asked which general types of source metadata they record. The most common information recorded was that pertaining to physical characteristics (93 percent), followed by provenance (70 percent), then physical location (59 percent).⁵⁰ Fewer than half (48 percent) recorded all three types. Just over a quarter (26 percent) recorded just two types, and an equal number (26 percent) recorded just one type.

Nearly a third of respondents (eight, or 31 percent) record some source metadata for all of their source objects; 23 percent record source metadata for less than one third of their source objects, and of those, 4 percent record no source metadata (see figure 13).⁵¹

If all fifty-four survey respondents are taken into account, at least 48 percent record no source metadata, although at least one (who stated this explicitly), and possibly others, holds only born-digital content and would have no source metadata to record.

Next, respondents were asked to gauge their satisfaction with the amount of source metadata that can be collected and the amount that actually is collected (see figure 14). Source metadata capability ("source metadata you CAN collect") had a higher rating average (2.74) than actual source metadata practice ("source metadata you DO (routinely

collect") (2.48).

Twenty-seven respondents assessed the amount of source metadata the repository can accommodate. Of those, nineteen (70 percent) felt the amount of metadata accommodated by their schema is "just right." In terms of actual practice, only fifteen (56 percent) felt the amount of metadata they routinely collect is "just right."

Survey responses were again reviewed individually to determine frequency and size of any gaps between metadata accommodated and metadata routinely recorded. For 80 percent of respondents, there was no gap; 16 percent had a gap of one rating point; 4 percent had a gap of two rating points.

Repository Tasks Supported by Repository Metadata

Respondents were offered a list of nineteen repository tasks, which have been established in the literature as key functions of trusted repositories (although it is interesting to note that not all respondents characterized their repositories as preservation repositories) (see figure 15).⁵² Respondents were then asked which of the tasks is supported by the repository's metadata. Of fifty-three respondents, the average number of tasks is 7.1.⁵³ The four most common tasks are

1. store original digital object;
2. document owner of intellectual property rights;
3. protect against data corruption and loss; and
4. track origins and chain of custody of digital object (provenance).

Any one task pertains to a particular repository function supported by one or more types of metadata, as follows. Because some functions are supported by more than one kind of metadata, some tasks are assigned to more than one category.

Object Use Tasks

(supported by rights metadata; cf. question 12)

- document owner of intellectual property rights
- document permissions to distribute, duplicate, transfer, or alter (e.g., through migration)
- store contractual agreements pertaining to rights and permissions

Table 9. Rating of Preservation Metadata Capability Relative to Number of Preservation Metadata Elements Accommodated

Rating	No. of Respondents with this Rating	No. of Elements Accommodated by Repositories with this Rating	Avg. No. of Elements Accommodated by Repository with this Rating
1 (way too little)	3	1	1
2	8	1-10	3
3 (just right)	6	1-11	4.2
4	3	5-10	7.3
5 (way too much)	1	2	2
Don't know	3	2-4	3

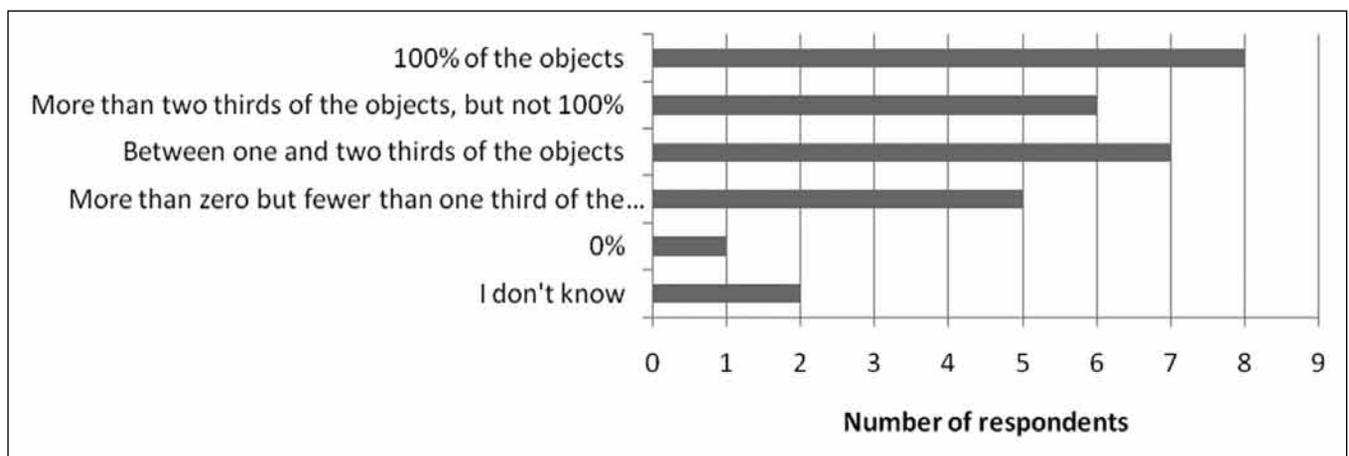


Figure 13. Portion of Repository Source Objects for Which Some Source Metadata is Recorded

- enable repurposing of content (e.g., for revenue generation)

Object Fixity, Integrity, and Authenticity Tasks
(supported by technical metadata; cf. question 16)

- store original digital object
- protect against data corruption and loss
- ensure authenticity of digital resources over time
- track origins and chain of custody of digital object (provenance)
- document digital object's bitstream over the long term
- ensure resources will survive and continue to be understandable into the long term
- maintain vigorous and ongoing testing and validation program to ensure independent understandability of the digital object
- enable format migration/transformation upon obsolescence
- track migration path of digital object and any changes over time (digital provenance)
- document relationships between multiple

manifestations of a digital object

Object Preservation Tasks
(supported by technical, preservation, and source metadata; cf. questions 16, 23, and 27)

- store original digital object
- protect against data corruption and loss
- ensure authenticity of digital resources over time
- track origins and chain of custody of digital object (provenance)
- document digital object's bitstream over the long term
- ensure resources will survive and continue to be understandable into the long term
- maintain vigorous and ongoing testing and validation program to ensure independent understandability of the digital object
- enable format migration/transformation upon obsolescence
- track migration path of digital object and any changes over time (digital provenance)
- document relationships between multiple

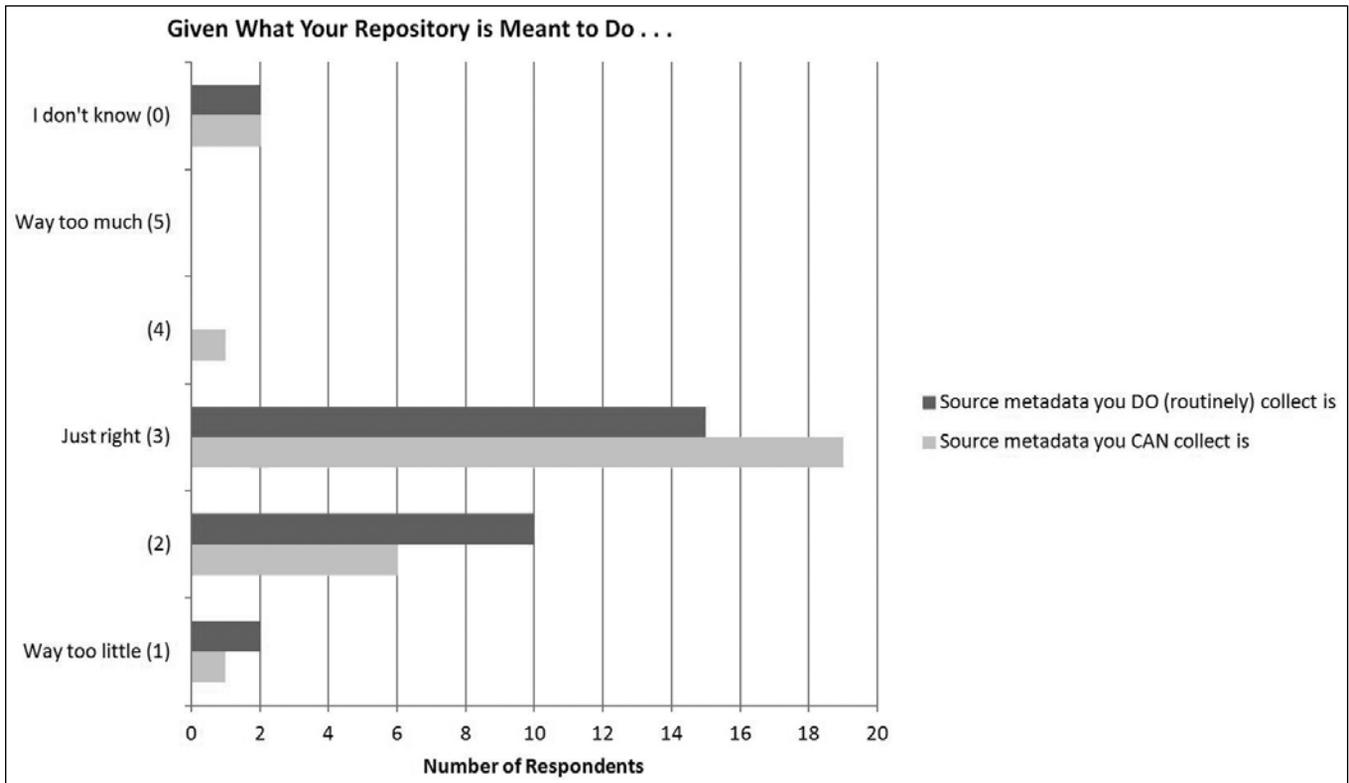


Figure 14. Source Metadata Capability Compared to Source Metadata Practice

manifestations of a digital object

- facilitate condition assessment of digital preservation master
- facilitate decision-making for preservation managers
- document preservation actions taken
- document effects of preservation strategies
- document details of original source object (e.g., provenance, preservation, condition)

Logically, the richer a repository's metadata in any given area, the more tasks in that area it can support. To test this hypothesis, the number of tasks (perceived to be) supported by each repository was charted alongside the number of metadata elements accommodated by that repository (see tables 10–12). For each task/metadata type pair, the number of tasks supported tends to rise with the number of metadata elements accommodated, as shown below.

Taking all respondents into account, repository metadata supported, on average, 1.6 of 4 use-related tasks (40 percent), 4.5 of 10 object fixity/integrity/authenticity tasks (45 percent), and 5.8 of 15 preservation tasks (39 percent).

Additional Factors Affecting the Recording of Metadata Creation

Much of the data above show that in general, metadata accommodated and recorded is insufficient to carry out many repository tasks. Several factors may account for the shortfall. One obvious factor could be a lack of staff resources. Use of automated metadata tools could mitigate the problem, at least as far as technical metadata are concerned. Therefore the survey included three questions on staffing and metadata extraction tools.

Respondents were first asked who creates their administrative metadata; the most common responses were the digital repository department, depositor, system supplied defaults, and cataloging and metadata department. On average, administrative metadata emanated from an average of 2.8 sources. Next, respondents were asked if the institution's staffing was sufficient to perform the tasks they had said were supported by their repository metadata; 45 percent said yes and 37 percent said no.

As for metadata extraction tools, only ten surveyed repositories use metadata extraction tools (23 percent of the forty-three accommodating technical metadata). The most commonly used tool is the JSTOR/Harvard Object Validation Environment (JHOVE) (nine), followed by Exiftool, the

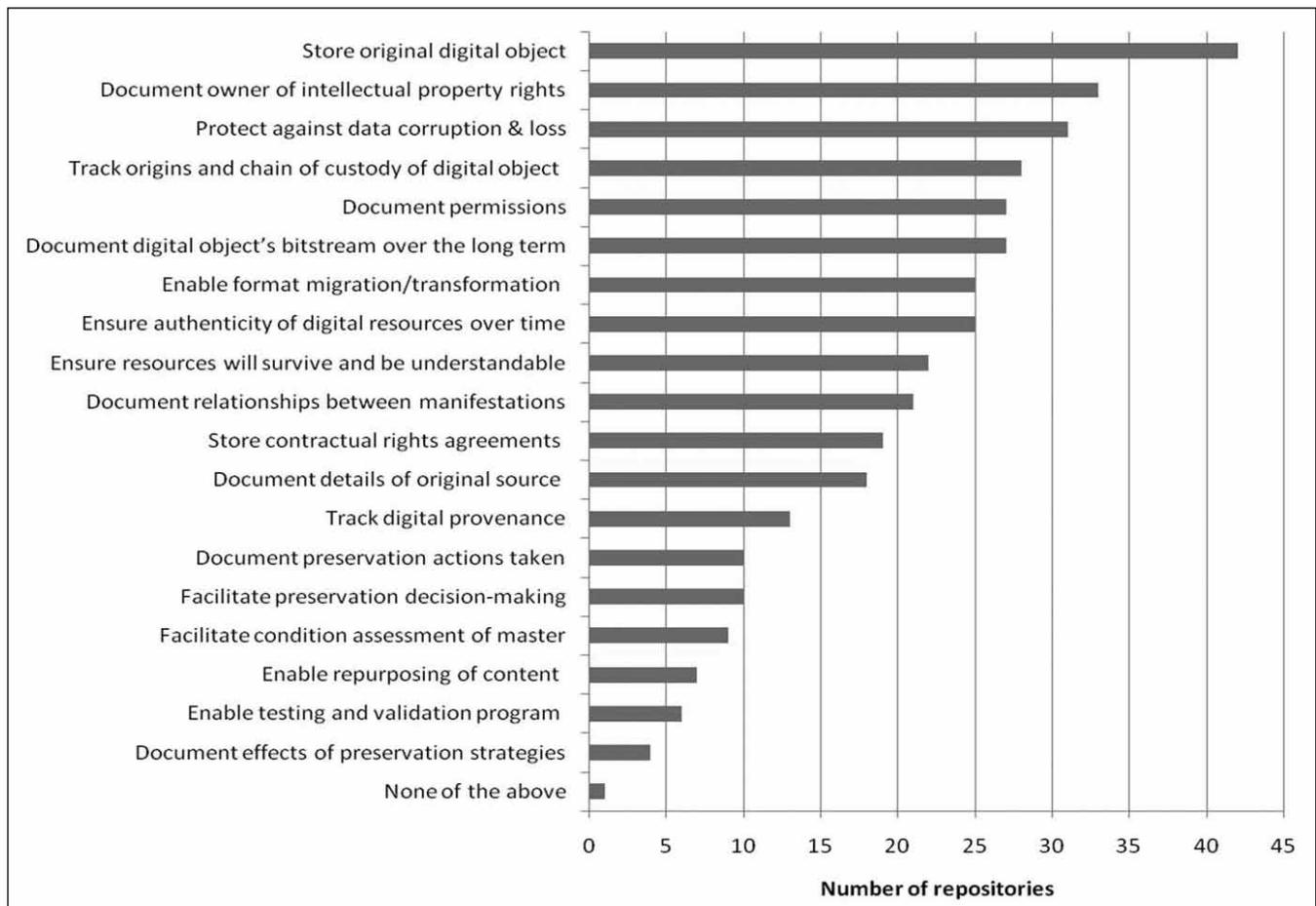


Figure 15. Tasks Supported by Repository Metadata

National Library of New Zealand's metadata extraction tool, and Flexible Image Transport System (FITS).

Conclusion

This study surveyed fifty-four ARL institutional repositories about their administrative metadata capabilities and practices. Responses throughout the survey indicate that in general, organizations are not accommodating administrative metadata to any significant extent. For example, on average, repositories accommodate only 3.6 rights metadata elements, three technical metadata elements, and 3.5 preservation elements. While organizations may record more metadata than the numbers suggest (since these numbers reflect only the number of elements dedicated to a particular piece of metadata), the parsing of that metadata is not sufficient to enable efficient retrieval, machine processing, reporting, and sharing. In any case, nearly a quarter (23 percent) record no rights metadata; nearly a third (31 percent)

record no technical metadata; and exactly half record no preservation metadata. Of all possible elements that might be accommodated by the repositories' schemas, only three were in use by more than half the surveyed repositories (format, file size, and rights statement). Only 35 percent of the surveyed repositories had a dedicated metadata element for storage location, which (interestingly) was the most commonly accommodated preservation metadata.

Moreover, across the board, for all metadata types, repository capability (measured by number of dedicated administrative metadata elements accommodated), outranks actual practice. For example, of those accommodating *some* rights metadata, less than a third recorded "some of" the rights metadata offered in the survey questions all of the time. Not surprisingly, few respondents think the amount of metadata they actually record is "just right" (between 32 percent and 42 percent, depending on metadata type). Responses suggest that in nearly all cases, where the metadata are not "just right," it falls short.

Administrative metadata cannot be assessed outside the

Table 10. Object Use Tasks and Rights Metadata: Average Number of Supported Tasks Relative to Number of Rights Elements Accommodated

No. of Rights Elements Accommodated	Avg. No. of Object Use Tasks Supported
0 (11 respondents)	.5
1–2 (13 respondents)	1.2
3–4 (13 respondents)	2.4
5–18 (16 respondents)	2.2

Table 11. Fixity/Integrity/Authenticity Tasks and Technical Metadata: Average Number of Supported Tasks Relative to Number of Technical Metadata Elements Accommodated

No. of Technical Elements Accommodated	Avg. No. of Fixity/Integrity/Authenticity Tasks Supported
0 (12 respondents)	2.7
1–2 (12 respondents)	4
3 (12 respondents)	3.9
4 (8 respondents)	6.5
5–11 (9 respondents)	6.8

Table 12. Preservation Tasks and Preservation Metadata: Average Number of Supported Tasks Relative to Number of Preservation Metadata Elements Accommodated

No. of Preservation Elements Accommodated	Avg. No. of Preservation Tasks Supported
0 (10 respondents)	1.4
1–3 (10 respondents)	0.8
4–6 (13 respondents)	2.5
7–8 (10 respondents)	4.7
9–24 (10 respondents)	6.4

context of the functions trusted repositories are meant to perform. Administrative metadata supports repository tasks related to object fixity, integrity, authenticity, use, and preservation. Without it, those tasks cannot be carried out. This survey found that of nineteen key repository tasks identified in the literature, an average of only 7.1 are supported by the repositories' metadata. Measured in terms of the metadata type supporting each task, repositories perform better on the fixity, integrity, and authenticity tasks; they are less prepared to support object use and preservation tasks.

There are many possible reasons for these "metadata shortfalls." The influx of digital materials is rapid and increasing at a rate that may well put their management beyond the means of most institutions. Metadata standards are voluminous and complex, and repositories must employ multiple standards to cover the necessary range of

administrative metadata, complicating implementation within any one system. Staffing may be an issue. Most surveyed institutions spread administrative metadata work across multiple units, suggesting a diversity of workflows and reporting structures. Thirty-seven percent of respondents found their staffing insufficient to perform repository tasks. Perhaps more discussion is needed to convey the importance of administrative metadata to digital collections management, preservation, and use. At the institutional level, it is unclear from this study who is determining what metadata will be accommodated and recorded, and whether those decisions are based on established repository objectives.

In any case, collaborative preservation is often assumed to be a universal good,⁵⁴ but if these survey results are an indicator, preservation of any kind appears to be a local phenomenon. The community is not putting enough effort into administrative metadata and the paucity of metadata being collected cannot support collaborative preservation. There seems to be a significant disconnect between what the community is saying and what is actually happening on the ground. There may even be skepticism in the community that collaborative preservation is valuable and possible.

This study points to several areas for further research. First, it is critically important to identify the core administrative metadata required to effectively manage and preserve repository resources. The best way to identify core metadata is to enumerate required repository tasks, then determine which individual pieces of metadata support each task. Once that work is done, libraries would benefit from exploring other obstacles to collecting administrative metadata. These might include issues related to self deposits, legacy metadata, expertise, and staffing levels. Any study that thoughtfully explores obstacles to the collection of rich, or even core, administrative metadata, could make a significant contribution to the field.

Reaching consensus on core administrative metadata is central to resolving current preservation challenges. If libraries are to make good on their promise to provide permanent, organized and secure repositories for institutional scholarship and special collections, they will need to examine current practices and identify core metadata in the context of repository objectives. They must identify barriers to metadata collection, strategize as to how those barriers might be mitigated or overcome, and move forward.

References and Notes

1. Metadata are "widely acknowledged to be crucial to the long-term preservation of digital entities." *Invest to Save: Report and Recommendations of the NSF-DELOS Working Group on Digital Archiving and Preservation*, viii, 2003, accessed July 14, 2013, http://eprints.erpanet.org/94/01/NSF_Delos_WG_Pres_final.pdf. "Digital preservation metadata is the

- information that is essential to ensure long-term accessibility of digital resources.” Angela Dappert and Adam Farquhar, “Implementing Metadata that Guides Digital Preservation Services,” in *iPRES 2009: The Sixth International Conference on Preservation of Digital Objects* (California Digital Library, Office of the President, 2009): 50, accessed July 14, 2013, <http://escholarship.org/uc/item/12p437bd>. “Reliable authentic digital objects will not be preserved across time without adequate preservation metadata.” Wendy Duff, “Metadata in Digital Preservation: Foundations, Functions and Issues,” in M. Bischoff, H. Hofman, and S. Ross, *Metadata in preservation: Selected Papers from ERPANET seminar at the Archives School Marburg, 3-5 September 2003* (Veröffentlichungen der Archivschule Marburg, Institute für Archivwissenschaft, Nr. 40): 27, cited in Steve Knight, “Preservation Metadata: National Library of New Zealand Experience,” *Library Trends* 54, no. 1 (Summer 2005): 96. A good overview of preservation metadata, including what that term encompasses, is found in Brian Lavoie and Richard Gartner, *Preservation Metadata: DPC Technology Watch Report no. 05-01: September 2005*, accessed July 14, 2013, www.dpconline.org/docs/reports/dpctw05-01.pdf.
2. Hamish James et al., “Feasibility and Requirements Study on Preservation of E-Prints: Report Commissioned by the Joint Information Systems Committee (JISC),” October 29, 2003, accessed July 14, 2013, www.jisc.ac.uk/media/documents/programmes/preservation/e-prints_report_final.pdf.
 3. Center for Research Libraries (CRL) and Online Computer Library Center (OCLC), *Trustworthy Repositories Audit & Certification: Criteria and Checklist* (Chicago: Center for Research Libraries, February 2007), 28, accessed July 14, 2013, www.crl.edu/sites/default/files/attachments/pages/trac_0.pdf.
 4. Research Libraries Group (RLG) and Online Computer Library Center (OCLC), *Trusted Digital Repositories: Attributes and Responsibilities* (Mountain View, CA: RLG, May 2002), 25, accessed July 14, 2013, www.oclc.org/research/activities/past/rlg/trustedrep/repositories.pdf.
 5. PREMIS’ core elements are applicable to objects in all formats, but lack the detailed, format-specific technical metadata that is “clearly necessary for implementing most preservation strategies.” *PREMIS Data Dictionary for Preservation Metadata*, version 2.0 (March 2008), 24, accessed July 14, 2013, www.loc.gov/standards/premis/v2/premis-2-0.pdf.
 6. For example, MPEG-7: ISO/IEC 15938, *Multimedia Content Description Interface*, accessed July 14, 2013, <http://mpeg.chiariglione.org/standards/mpeg-7>.
 7. For example, AES57-2011: *AES Standard for Audio Metadata—Audio Object Structures for Preservation and Restoration* (New York: Audio Engineering Society, 2011).
 8. For example, *PREMIS Data Dictionary*.
 9. Most obviously, Dublin Core. “DCMI Metadata Terms,” Dublin Core Metadata Initiative, 2012, accessed July 14, 2013, dublincore.org/documents/dcmi-terms.
 10. Mingyu Chen and Michele Reilly, “Implementing METS, MIX, and DC for Sustaining Digital Preservation at the University of Houston Libraries,” *Journal of Library Metadata* 11, no. 2 (April 2011): 95, doi: 19386389.2011.570662.
 11. RLG and OCLC, *Trusted Digital Repositories*.
 12. Clifford A. Lynch, “Institutional Repositories: Essential Infrastructure for Scholarship in the Digital Age,” *portal: Libraries and the Academy* 3, no. 2 (April 2003): 327–36.
 13. James et al., “Feasibility and Requirements Study.”
 14. nector: Network of Expertise in long-term STORAge Working Group on Trusted Repositories Certification, *Catalogue of Criteria for Trusted Digital Repositories* (Frankfurt: Deutsche Nationalbibliothek, June 2006).
 15. CRL and OCLC, *Trustworthy Repositories Audit & Certification*.
 16. For example, Charles W. Bailey et al. found that preservation is viewed as one of the top three benefits of the institutional repository. *SPEC Kit 292: Institutional repositories* (Washington, DC: Association of Research Libraries, 2006): 21, accessed July 14, 2013, <http://publications.arl.org/Institutional-Repositories-SPEC-Kit-292/21>. Library leaders have not only ranked preservation high, but they perceive preservation issues as a key benefit for potential repository users and contributors. See Elizabeth Yakel et al., “Institutional Repositories and the Institutional Repository: College and University Archives and Special Collections in an Era of Change,” *American Archivist* 71 (Fall/Winter 2008): 339–40.
 17. *Invest to Save*, 2.
 18. Yakel et al., “Institutional Repositories and the Institutional Repository,” 339.
 19. Seamus Ross, “Challenges to Digital Preservation and Building Digital Libraries,” *World Library and Information Congress: 69th IFLA General Conference and Council, 1–9 August, 2003, Berlin*, 6–7 accessed July 14, 2013, http://eprints.erpamet.org/104/01/ROSS_IFLABERLIN2003_209e-Ross.pdf.
 20. Steve Knight, “Preservation Metadata: National Library of New Zealand Experience,” *Library Trends* 54, no. 1 (Summer 2005): 95.
 21. Kathleen Shearer, “The CARL Institutional Repositories Project: A Collaborative Approach to Addressing the Challenges of IRs in Canada,” *Library Hi Tech* 24, no. 2 (2006): 170.
 22. Mary Westell, “Institutional Repositories: Proposed Indicators of Success,” *Library Hi Tech* 24, no. 2 (2006): 222.
 23. DigitalPreservationEurope, “DPE Research Roadmap, DPE-D7.2,” June 2006, accessed July 14, 2013, www.digitalpreservationeurope.eu/publications/dpe_research_roadmap_D72.pdf. See pages 28, 19, and 20.
 24. For example, the JISC report, in citing the high cost of metadata, notes that “it is notoriously difficult to predict” preservation costs, in part due to the lack of practical experience on which to base cost estimates. James et al., “Feasibility and Requirements Study,” 41.

25. See, for example, RLG and OCLC, *Trusted Digital Repositories*, 19–20, and Raym Crow, *The Case for Institutional Repositories: A SPARC Position Paper* (Washington, DC: SPARC, 2002), 27–28, accessed July 14, 2013, www.sparc.arl.org/bm~doc/ir_final_release_102.pdf.
26. James et al., “Feasibility and Requirements Study,” 5. The blueprint comment appears on page 35.
27. Knight, “Preservation Metadata,” 97.
28. Daniel Gelaw Alemneh, “Barriers to Adopting PREMIS in Cultural Heritage Institutions: An Exploratory Study,” in *Archiving 2008 Final Program and Proceedings, Washington, DC* (Springfield, VA: Society for Imaging Science and Technology): 71–80, cited in Devan Ray Donaldson and Paul Conway, “Implementing PREMIS: A Case Study of the Florida Digital Archive,” *Library Hi Tech* 28, no. 2 (2010): 276.
29. Priscilla Caplan, “Preservation Metadata,” in Seamus Ross and Michael Day, *DCC Digital Curation Manual* (Edinburgh: Digital Curation Centre: July 2006), 23, 26, accessed July 14, 2013, www.dcc.ac.uk/sites/default/files/documents/resource/curation-manual/chapters/preservation-metadata/preservation-metadata.pdf.
30. Angela Dappert and Markus Enders, “Digital Preservation Metadata Standards,” *Information Standards Quarterly* 22, no. 2 (Spring 2010): 5–13.
31. Dappert and Farquhar, *Implementing Metadata that Guides Digital Preservation Services*, 50.
32. “Preservation Metadata,” Paradigm, accessed July 14, 2013, www.paradigm.ac.uk/workbook/metadata/preservation-considerations.html.
33. See, for example, LDP Centre, *CODA-META: Curation of Digital Assets-Metadata* (Boden, Sweden: LDB-cemtri, 2008) and Bronwyn Lee, Gerard Clifton, and Somaya Langley, *Australian Partnership for Sustainable Repositories PREMIS Requirement Statement Project Report* (National Library of Australia, July 2006): 28–31.
34. For studies of descriptive metadata or metadata more generally, see, for example, Eun G. Park and Marc Richard, “Metadata Assessment in e-Theses and Dissertations of Canadian Institutional Repositories,” *Electronic Library* 29, no. 3 (2011): 394–407; Jung-ran Park and Yuji Tosaka, “Metadata Creation Practices in Digital Repositories and Collections: Schemata, Selection Criteria, and Interoperability,” *Information Technology & Libraries* 29, no. 3 (2010): 104–16; and Jin Ma, “Metadata in ARL Libraries: A Survey of Metadata Practices,” *Journal of Library Metadata* 9, no. 1-2 (2009): 1–14. Lopatin surveyed library metadata practices for digital projects but was not necessarily surveying repositories. See Laurie Lopatin, “Metadata Practices in Academic and Non-Academic Libraries for Digital Projects: A Survey,” *Cataloging & Classification Quarterly* 48, no. 8 (2010): 716–42.
35. Gail McMillan, Matt Schultz, and Katherine Skinner, *SPEC Kit 325: Digital Preservation* (Washington, DC: Association of Research Libraries, October 2011). Findings regarding metadata schemas in use reflect the findings of this paper; see p. 11.
36. ROAR and OpenDOAR both attempt to provide up-to-date and comprehensive listings of open access repositories. ROAR is hosted by the School of Electronics and Computer Science at the University of Southampton; it lists repositories worldwide and provides information on the growth and status of repositories in an effort to promote the development of open access. OpenDOAR is a directory of academic open access repositories, run by the Centre for Research Communications (CRC).
37. In the questionnaire, “digital library” was defined as a repository “limited to digitized library or archive collections,” but in hindsight should have included born-digital library collections. Therefore responses fitting the broader definition were included in the “digital library” category.
38. Several respondents noted caveats. One organization’s repository could accept media files “but lacks dynamism to stream”; files can simply be uploaded to the repository and downloaded by users. Two organizations noted that while their repositories could accept many formats, the extent to which those files are preserved is format-dependent. Another noted that a set of files might be archived, but not necessarily as a “supported live object that can execute scripts.” Of course repositories can *accommodate* metadata for many types of materials, but this does not mean the repositories actually *house* all those types of materials. The survey did not ask for number of the various types of resources actually housed.
39. When this survey was originally drafted, AES57-2011 was in draft form. Due to an oversight, it was never added into the list of schema options before the survey was distributed to respondents. For the record, AES57-2011 was listed under “other” by one repository.
40. One respondent selected “none of the above” and declined to specify what standards were incorporated into the repository schema; this respondent was excluded from the count of total respondents to this question.
41. Of fifty-four total respondents, fifty-three named their metadata schema; one selected “none of the above” and did not specify.
42. All other standards were incorporated by fewer than three organizations, and included the Text Encoding Initiative (TEI), Visual Resources Association (VRA) Core, Library of Congress AV Prototype for Audio, Library of Congress AV Prototype for Video, PBCore. A number were incorporated by just one organization: AES57, DocumentMD, FITS, harvestMD, hulDrsAdmin, hulDrsRights, textMD, MPEG-7, California Digital Library, copyrightMD, Library of Congress AV Prototype for text, Analyzed Layout and Text Object (ALTO), FOXML (for capturing audit history), and Darwin Core.
43. One respondent answered “I don’t know.” Because of this respondent’s answers to other rights metadata questions, the response was converted to “no,” and the respondent’s answers to rights metadata questions 12–14 were accordingly deleted from the data set.

44. Based on two comments associated with the rights metadata questions, it is likely that batchloaded legacy metadata may account, in part, for the dearth of rights metadata. Two additional respondents' comments belied a perception that rights metadata is not necessary if all resources are public domain, or otherwise of a kind. The inclusion of consortial repositories in the survey further complicates data analysis here, since it is not always possible to dictate policy and practice to individual consortium members.
45. Of forty-three repositories accommodating technical metadata, two did not specify elements and were therefore deleted from this data set.
46. There were thirty-five valid responses to this question. Four respondents replied "I don't know" to one or both parts of the question and three respondents appeared to misinterpret the question; these seven respondents were deleted from this data set. (Although what *can be* collected was meant to refer to system capability, three respondents rated what actually *is* collected higher than what *can be* collected, suggesting an alternative interpretation of the question.)
47. Fifteen respondents rated the repository capability "just right" and specified the number of technical metadata elements accommodated. One respondent failed to specify and that response was deleted from this data set.
48. Of the thirty respondents who said their repositories accommodate some preservation metadata, three qualified their "yes" with comments which roughly equated to "coming soon." One such respondent was able to specify actual elements in question 23, so that "yes" answer was retained even though it appeared that full implementation had not yet occurred; in the other two cases, no elements were specified in question 23, so the "yes" answer was converted to a "no." After these adjustments, it can be said that twenty-eight of fifty-four surveyed repositories (52 percent) accommodate preservation metadata.
49. Of the twenty-eight repositories accommodating preservation metadata, four declined to specify which elements were used, selecting either "none of the above" or "other," without enumerating alternatives.
50. Of the twenty-nine repositories recording source metadata, one respondent said "none of the above" but did not elaborate. Another, answering for a consortium, was unable to provide a clear picture of contributed source metadata and so did not specify information types. These two responses were deleted from the data set.
51. There were twenty-five valid responses to the question. Two respondents replied "I don't know," and one misinterpreted the question, basing the percentage on a mix of born digital and digitized content; these responses were removed from the data.
52. The list of tasks is a synthesis of information from a number of sources, including *PREMIS Data Dictionary; Trustworthy Repositories Audit & Certification*; OCLC/RLG Working Group on Preservation Metadata, *Preservation Metadata for Digital Objects: A Review of the State of the Art*, 2001, accessed July 14, 2013, www.oclc.org/content/dam/research/activities/pmwg/presmeta_wp.pdf; *Reference Model for an Open Archival Information System (OAIS): Recommended Practice* (Washington, DC: Consultative Committee for Space Data Systems, 2012), accessed July 14, 2013, <http://public.ccsds.org/publications/archive/650x0m2.pdf>; James et al., "Feasibility and Requirements Study."
53. Fifty-three of the fifty-four total respondents specified tasks supported by their metadata. (One respondent chose "none of the above" but specified no alternative and this response was pulled from the data set in calculating percentages and averages for this question.)
54. For example, Hockx-Yu cites the "need for new, shared preservation services and information infrastructure" and describes the Joint Information Systems Committee's vision of shared preservation services. Helen Hockx-Yu, "Digital Preservation in the Context of Institutional Repositories," *Program: Electronic Library and Information Systems* 40, no. 3 (2006): 237, 239–41. Dappert and Enders describe digital content preservation as a "collaborative effort," mentioning content sharing and a specific implementation to allow exchange of complex objects between heterogeneous preservation systems (TIPR, Towards Interoperable Preservation Repositories). Angela Dappert and Markus Enders, "Digital Preservation Metadata Standards," *Information Standards Quarterly* 22, no. 2 (Spring 2010): 12–13; DigitalPreservationEurope's *Research Roadmap* recommends the digital preservation community focus on developing services which "support the work of collaborative and distributed archival and preservation teams." DigitalPreservationEurope, "DPE Research Roadmap, DPE-D7.2," 31.

Appendix. The Survey

[Note: An asterisk preceding a survey question indicates that a response was required.]

Introduction

You are invited to participate in a research study about administrative metadata. The purpose of this research is to identify the administrative metadata collected by ARL repositories and to determine how that metadata is currently used. This survey addresses administrative metadata of four types: rights metadata, technical metadata, source metadata, and preservation metadata.

A snapshot of current ARL practices identifying commonly collected data should help define core administrative metadata, stimulate the development of best practices and tools, as well as encourage discussion of collaborative uses of administrative metadata, to ensure longevity of ARL digital collections.

We are looking for a single institutional response. If you have more than one repository, please answer the questions for your primary repository, the one housing your organization's scholarship, and/or digital collections, i.e., the one most aligned with your institutional mission. If your organization hosts a consortial repository, please coordinate a single response from a representative of that repository. In some cases an organization will have one response for its own repository and a second response for a consortial repository.

Answers are saved as you respond. You can stop at any time and return to the survey later *if you enable cookies in your browser.*

This survey is being conducted by xxxxxx at xxxxxx.

We thank you for participating!

Consent Form

This research is confidential. The research records will include some information about you and this information will be stored in such a manner that some linkage between your identity and the response in the research exists. The information collected about you includes name, email, and position title (all optional), and organization name. Please note that we will keep this information confidential by limiting individuals' access to the research data and keeping it in a secure location.

The research team and the Institutional Review Board (a committee that reviews research studies in order to protect research participants) at xxxxx are the only parties that will be allowed to see the data, except as may be required by law. If a report of this study is published, or the results are presented at a professional conference, only group results will be stated. All study data will be kept for five years.

There are no foreseeable risks to participation in this study. In addition, you may receive no direct benefit from taking part in this study.

The survey will take about 15–20 minutes to complete, depending on responses. Participation in this study is voluntary. You may choose not to participate, and you may withdraw at any time during the study procedures without any penalty to you. In addition, you may choose not to answer any questions with which you are not comfortable.

If you have any questions about the study or study procedures, you may contact me at xxxxxx

If you have any questions about your rights as a research subject, you may contact the IRB Administrator at xxxxx at: xxxxx

- *1. By completing this survey you agree to be a study subject. Please click "YES" to continue the survey. If you do not agree with the consent form and wish not to participate in this project, please click "No" to exit from this survey.
- Yes, I agree to participate
 - No, I do not agree to participate

About Your Repository

2. Please tell us the name of your primary repository, the one housing your organization's scholarship, and/or digital collections, i.e., the one most aligned with your institutional mission (for example, Deep Blue). All questions in the survey will pertain to the repository named here.
- *3. Please provide the URL for your repository's public homepage.
- *4. This repository is:
- "the" institutional repository (of broad scope but limited to the organization's scholarly output)
 - the organization's digital library, limited to digitized library or archive collections
 - a repository combining scholarly output with digitized library/archive collections
 - an explicitly subject- or format-specific repository not falling into one of the above categories
 - Other (please specify)

- *5. Which repository software does this repository use?
- Archimede
 - contentDM
 - CWIS
 - Digital Commons
 - DigiTool
 - DSpace
 - Eprints
 - ETD-db
 - Fedora
 - Greenstone
 - IR+
 - Red Hat
 - Other (please specify)
- *6. About how many fully cataloged resources do you add annually to your repository?
- Under 1000
 - 1000–5000
 - Over 5000
- Comments:
- *7. What types of resources can this repository currently accept? Choose all that apply.
- Texts (e.g., books, letters, dissertations, periodicals)
 - Still images (e.g., photographs, graphics, maps)
 - Video
 - Audio
 - Data sets
 - None of these
 - Other (please specify)

Your Administrative Metadata

- *8. If you incorporate elements from any of these metadata standards for your repository's rights, technical, source, or preservation metadata, please indicate which. Choose all that apply.
- Simple Dublin Core
 - Qualified Dublin Core
 - MODS
 - MARC
 - PREMIS
 - NISO MIX (Z39.87)
 - PBCore
 - MPEG-7
 - California Digital Library copyrightMD
 - LC AV Prototype- text schema
 - LC AV Prototype- AMD (audio) schema
 - LC AV Prototype- VMD (video) schema
 - LC AV Prototype- IMD (analog image) schema
 - LC AV Prototype- RMD (rights) schema
 - LC AV Prototype- PMD (digiprov) schema
 - None of the above
 - Other (please specify)
9. If the metadata your repository collects is documented and publicly available, what is the URL?
10. If metadata your repository collects is documented but not freely available on the Web, would you be willing to share the documentation with us? (Please send to xxxxx.)
- yes
 - no
 - not applicable
- Comments:

Rights Metadata

- *11. Does your repository accommodate rights metadata? Rights metadata is information about intellectual property rights granted or reserved, copyright holder or licensor, etc.
- yes
 - no (skip to technical metadata)
 - I don't know
- Comments:

*12. Indicate which rights elements your metadata scheme *accommodates*

*Check the box if your metadata scheme has an element dedicated to that information, or a more granular form of it. If your metadata scheme has no *dedicated* element for that information, LEAVE THE BOX UNCHECKED, whether or not the scheme can accommodate the information elsewhere (for example, in a note). We are trying to determine 1) what data can be collected and 2) the granularity of repository metadata schemes.*

- | | |
|--------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|
| <input type="checkbox"/> Rights statement or license terms | <input type="checkbox"/> unavailable) |
| <input type="checkbox"/> Rights granted the repository (replicate, migrate, modify, use, delete, etc.) | <input type="checkbox"/> Rationale for availability status (e.g., deed of gift) |
| <input type="checkbox"/> Copyright status (e.g., copyright protected, public domain) | <input type="checkbox"/> Publication status (e.g., published, unpublished, unknown) |
| <input type="checkbox"/> Copyright jurisdiction | <input type="checkbox"/> Indication if watermarked |
| <input type="checkbox"/> Statute citation | <input type="checkbox"/> Agent name (e.g., Rightsholder) |
| <input type="checkbox"/> Statute jurisdiction | <input type="checkbox"/> Agent contact information (e.g., Rightsholder contact information) |
| <input type="checkbox"/> Date of original copyright | <input type="checkbox"/> Note(s) about rights |
| <input type="checkbox"/> Date of copyright renewal | <input type="checkbox"/> Link(s) to rights documentation |
| <input type="checkbox"/> Rights basis (copyright, license, statute) | <input type="checkbox"/> None of the above |
| <input type="checkbox"/> Copyright notice as it appears on the resource | <input type="checkbox"/> Other (please specify) |
| <input type="checkbox"/> Availability status (e.g., open, restricted, | |

*13. For what percentage of your repository objects (roughly) do you record some rights metadata of the types mentioned above?

- | | |
|---------------------------------------------------------------------------------|----------------------------------------------|
| <input type="checkbox"/> 0% | <input type="checkbox"/> 100% of the objects |
| <input type="checkbox"/> More than zero but fewer than one third of the objects | <input type="checkbox"/> I don't know |
| <input type="checkbox"/> Between one and two thirds of the objects | Comments: |
| <input type="checkbox"/> More than two thirds of the objects, but not 100% | |

*14. Given what your repository is meant to do

Rights metadata you CAN collect is

-
- Way too little Just right Way too much I don't know

Rights metadata you DO (routinely) collect is

-
- Way too little Just right Way too much I don't know

Technical Metadata

*15. Does your repository accommodate technical metadata? Technical metadata describes the characteristics of the archival digital file, e.g., file size, compression scheme, operating system, codec, etc.

- yes
- no (skip to technical metadata)
- I don't know

Comments:

*16. Indicate which technical metadata elements your metadata scheme *accommodates*

*Check the box if your metadata scheme has an element dedicated to that information, or a more granular form of it. If your metadata scheme has no *dedicated* element for that information, LEAVE THE BOX UNCHECKED, whether or not the scheme can accommodate the information elsewhere (for example, in a note). We are trying to determine 1) what data can be collected and 2) the granularity of repository metadata schemes.*

- Levels of encoding or encryption applied
- Fixity check data
- File size
- Format (.pdf, .htm)
- Creating application name [and/or version]
- Information on access inhibitors (encryption, password protection)
- Technical metadata notes
- Compression data (whether or not compressed, compression ratio etc.)
- Color space
- Capture information (who did it, scanner/camera details, etc.)
- Orientation (e.g., landscape or portrait, degrees of rotation)
- Bits per sample (8-bit;16-bit, etc.)
- Embedded application data
- None of the above
- Other (please specify)

*17. Indicate which ADDITIONAL technical metadata elements for VIDEO your scheme accommodates. These elements apply to the archival digital object itself.

*Check the box if your metadata scheme has an element dedicated to that information, or a more granular form of it. If your metadata scheme has no *dedicated* element for that information, LEAVE THE BOX UNCHECKED, whether or not the scheme can accommodate the information elsewhere (for example, in a note). We are trying to determine 1) what data can be collected and 2) the granularity of repository metadata schemes.*

- We don't accept video in our repository
- Time code
- Duration
- Signal format (NTSC, PAL, etc.)
- Codec information (name, version, creating app, etc.)
- Bit rate information (kBps, whether fixed or variable, etc.)
- Sampling information (sampling rate, bit depth, word size, etc.)
- Video encoding scheme
- Byte order (little endian or big endian)
- Frame information (height & width, aspect ratio, frame rate)
- Presence of sound
- Audio channel data (no. of channels, left-right position, etc.)
- Audio presentation (stereo, mono, etc.)
- Audio codec information (name, version, creating app, etc.)
- Audio bit rate information (kBps, whether fixed or variable, etc.)
- Audio sampling information (sampling rate, bit depth, word size, etc.)
- None of the above
- Other (please specify)

*18. Indicate which ADDITIONAL technical metadata elements for AUDIO your scheme accommodates. These elements apply to the archival digital object itself.

*Check the box if your metadata scheme has an element dedicated to that information, or a more granular form of it. If your metadata scheme has no *dedicated* element for that information, LEAVE THE BOX UNCHECKED, whether or not the scheme can accommodate the information elsewhere (for example, in a note). We are trying to determine 1) what data can be collected and 2) the granularity of repository metadata schemes.*

- We don't accept audio in our repository
- Time code
- Duration
- Audio encoding (e.g., PCM)
- Byte order (little endian or big endian)
- First sample offset (number of bytes immediately prior to the first byte of audio data)
- Information on audio data blocks
- Audio channel data (no. of channels, left-right position, etc.)
- Audio presentation (stereo, mono, etc.)
- Audio codec information (name, version, creating app, etc.)
- Audio bit rate information (kBps, whether fixed or variable, etc.)
- Audio sampling information (sampling rate, bit depth, word size, etc.)
- None of the above
- Other (please specify)

*19. Which of these metadata extraction tools do you employ?

- We do not use metadata extraction tools
- EMET (ARTstor)
- Exiftool
- File identifier (Optima SC Inc.)
- Jhove
- Metadata extraction tool (National Library of New Zealand)
- Other (please specify):

*20. For what percentage of your repository objects (roughly) do you record some technical metadata of the types mentioned above?

- 0%
- More than zero but fewer than one third of the objects
- Between one and two thirds of the objects
- More than two thirds of the objects, but not 100%
- 100% of the objects
- I don't know

Comments:

*21. Given what your repository is meant to do

Technical metadata you CAN collect is

-
- Way too little Just right Way too much I don't know

Technical metadata you DO (routinely) collect is

-
- Way too little Just right Way too much I don't know

Preservation Metadata

*22. Does your repository accommodate preservation metadata? Preservation metadata is that which supports the digital preservation process, beyond digital characteristics of the archival file.

- yes
- no (skip to source metadata)
- I don't know

Comments:

*23. Indicate which preservation elements your scheme accommodates.

*Check the box if your metadata scheme has an element dedicated to that information, or a more granular form of it. If your metadata scheme has no *dedicated* element for that information, LEAVE THE BOX UNCHECKED, whether or not the scheme can accommodate the information elsewhere (for example, in a note). We are trying to determine 1) what data can be collected and 2) the granularity of repository metadata schemes.*

- Preservation level (bit-level, full, etc.)
- Significant properties (properties to be preserved, such as content, appearance, structure, behavior, context)
- Storage location (file location, location scheme (e.g., handle, URI), storage medium (hard disc, mag tape, etc.))
- Hardware/software supporting use of the object (including operating system and associated files required to use or render the object)
- Digital signature (signature itself, its encoding, encryption/hash algorithms, etc.)
- Preservation action (e.g., migration)
- Preservation outcome
- Person/organization responsible for preservation action
- Software associated with preservation action
- Generation or use type (preservation master, production master, etc.)
- Embedded application data
- Links between objects when one is derived from the other
- Condition evaluation
- None of the above
- Other (please specify)

*24. For what percentage of your repository (roughly) do you record some preservation metadata of the types mentioned above?

- 0%
- More than zero but fewer than one third of the objects
- Between one and two thirds of the objects
- More than two thirds of the objects, but not 100%
- 100% of the objects
- I don't know

Comments:

*25. Given what your repository is meant to do

Preservation metadata you CAN collect is

-
- Way too little Just right Way too much I don't know

Preservation metadata you DO (routinely) collect is

-
- Way too little Just right Way too much I don't know

Source Metadata

*26. Does your repository accommodate source metadata? Source metadata documents the physical characteristics of the original (usually analog) PHYSICAL source object from which the digital master is derived (for example, an original film negative or vinyl record). It might include elements such as dimensions, sound and color characteristics, etc.

- yes
- no (skip source metadata questions)
- I don't know

Comments:

*27. Which of the following do you record in your source metadata?

- Physical characteristics of the object (extent, color characteristics, sound characteristics for audio, gauge for film and video, etc.)
- Physical location
- Provenance information
- None of the above
- Other (please specify)

*28. Thinking only of those digital repository resources for which you also hold the physical source object, for what percentage of those source objects (roughly) do you record some source metadata?

- We are asking about elements for "physical characteristics" of the original source object; this question is NOT about descriptive metadata.
- Between one and two thirds of the objects
- 0%
- More than two thirds of the objects, but not 100%
- 100% of the objects
- I don't know
- More than zero but fewer than one third of the objects

Comments:

*29. Given what your repository is meant to do

Source metadata you CAN collect is

-
- Way too little Just right Way too much I don't know

Source metadata you DO (routinely) collect is

-
- Way too little Just right Way too much I don't know

How Your Metadata is Used

*30. Which of these tasks does your metadata support?

- Store original digital object
- Protect against data corruption & loss
- Ensure authenticity of digital resources over time
- Track origins and chain of custody of digital object (provenance)
- Document digital object's bitstream over the long term
- Ensure resources will survive and continue to be understandable into the long term
- Maintain vigorous and ongoing testing and validation program to ensure independent understandability of the digital object
- Enable format migration/transformation upon obsolescence
- Track migration path of digital object & any changes over time (digital provenance)
- Document owner of intellectual property rights
- Document permissions to distribute, duplicate, transfer, and/or alter (e.g., through migration)
- Store contractual agreements pertaining to rights and permissions
- Facilitate condition assessment of digital preservation master
- Facilitate decision-making for preservation managers
- Document preservation actions taken
- Document effects of preservation strategies
- Document relationships between multiple manifestations of a digital object
- Document details of original source object (e.g., provenance, preservation, condition)
- Enable repurposing of content (e.g., for revenue generation)
- None of the above
- Other (please specify)

*31. Who creates your administrative metadata? (Check all that apply.)

- Depositor
- Cataloging and metadata department
- Digital repository department
- Special collections department
- Metadata extraction tool
- System supplied defaults
- None of the above
- Other (please specify)

*32. Does your organization have staffing sufficient to perform the tasks you checked?

- yes
- no
- I don't know
- not applicable

Comments:

Your Information

33. Please tell us your name.

34. Please tell us your email address.

*35. Your organization:

36. Your title:

*37. If you are developing best practices that might be useful to explore further, we would like to follow up with you for more information, and will send you a preview of our findings. May we follow up with you for further information or clarification?

- yes
- no

Thank you!

Thank you for participating in our survey. We very much appreciate your contribution. If you have any questions, please feel free to contact us.

xxxxx

xxxxx

E-Resource Acquisitions in Academic Library Consortia

Christine N. Turner

Scholarly publishing is the information marketplace in which academic libraries function, and major shifts in traditional publishing and pricing models are in process. Library consortia have long been viewed as a means of increasing purchasing power and reducing costs. In late 2010, the Five College Libraries (FCL) hired R2 Consulting, LLC to investigate and make recommendations regarding how the Libraries cooperate more closely on the acquisition, management, and delivery of electronic resources. This study examines and evaluates how other academic library consortia are licensing and acquiring electronic books, databases, journals and streaming media. The organizations, activities, processes, history and trends of e-resource acquisitions and collection development at the Colorado Alliance of Research Libraries (CARL), Orbis Cascade Alliance (OCA), Triangle Research Libraries Network (TRLN) and Washington Research Library Consortium (WRLC) are presented with data collected by the author. Additional context is provided through a literature review, and a discussion of current practices provides a sampling of the new directions academic library consortia are taking and the challenges they face.

In the wake of the 2008 housing market collapse, rising unemployment, stock market downturn, and subsequent tightening of budgets and loss of endowment funds, the presidents and chancellor of the Five Colleges consortium institutions—Amherst College, Hampshire College, Mount Holyoke College, Smith College and the University of Massachusetts (UMass) Amherst—wrote to members in an email on April 9th, 2009, “In these difficult economic times leveraging our resources to expand the breadth of our library resources is essential.” With this message, the leaders of each campus signaled their recognition of the financial need for more collaboration between the libraries in many aspects of their operations, including collection development and acquisitions.

Scholarly publishing is the information marketplace in which academic libraries function, and major shifts in traditional publishing and pricing models are in process. Library consortia have long been viewed as a means of increasing purchasing power and reducing costs. The University Leadership Council (ULC) of the Advisory Board Company (www.eab.com) identified several areas where academic libraries are applying pressure to reduce the escalating costs of scientific journals and databases in the digital realm, including pay-per-article models as an alternative to the “Big Deal” package of electronic journals bundled and

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priced based on print subscription costs, open access initiatives, and of primary concern here, “centralized purchasing authority essential in deriving savings from library consortia.”¹ Between the state-level consortia operating effectively in California (California Digital Library) and Ohio (Ohio-Link), and many loosely affiliated buying-clubs of libraries opting-in to discounted pricing offered by publishers based on levels of participation, consortia are striving to find ways to influence the scholarly publishing marketplace, improve access to a wider breadth of electronic resources, improve operational efficiencies, and reduce costs. Dan Hazen, associate director for collection development at Harvard University, describes current trends:

Cooperative arrangements and consortia are further reshaping the institutional environment. Economies of scale, aggregated expertise, new synergies and unexpected opportunities, and strengthened political coalitions and operational capacities are among potential benefits. Local autonomy is less possible or desirable than ever—even as institutional competition remains a hallmark of American higher education.²

The Five College Librarians Council (FCLC) recognized this challenge and set their sights on improving collaborative electronic resources licensing and management. They met with three consulting firms, and in late 2010, the Five College Libraries (FCL) hired R2 Consulting, LLC (www.ebookmap.net/index.php), which had previously worked with Smith and Mount Holyoke Colleges on technical services workflow improvements. R2 was asked to investigate and make recommendations on how the FCL could cooperate more closely on the management and delivery of electronic resources.

The libraries at Amherst College, Hampshire College, Mount Holyoke College, Smith College and UMass Amherst have a long history of collaboration dating back to the founding of the Five Colleges consortium in 1965. As with many academic library consortia, the early focus of activities was on resource sharing, reciprocal borrowing, a shared integrated library system, and a shared storage facility, all for print resources. In 2009, they agreed to principles and processes for avoiding unnecessary duplication of print monographs. This cooperative collection development project had a print focus when the acquisitions budgets at each library had shifted from print to electronic resources. By 2010, nearly 70 percent of the combined budgets were dedicated to electronic resources.³

Following a study of e-resource management and delivery operations at each library and consortium-level collaboration, R2 proposed the creation of a shared e-content budget for e-resources purchased in common, maximizing

the number of core e-resources across FCL, and negotiating more licenses at the consortium level.⁴ Cost savings was not a stated outcome of the proposed changes, though the recommendations were made in an economic environment of strained acquisitions budgets, as highlighted by the chancellor and presidents of the Five Colleges institutions. R2 noted that implementing their suggested changes might lead to cost benefits, but “even if more favorable pricing is not available for all these resources, the case to be made is not simply subscription savings, but operational savings and most importantly, an immensely more uniform user experience.”⁵ While R2’s recommendations addressed streamlining both delivery and management of common e-resource collections across FCL, the benefits and challenges of consortial collection development and acquisitions are the focus here.

The author’s assumption was that FCL, while unique in some ways, was not atypical. The organization and activities of other academic library consortia, the history of collaborative collection development, the shift of acquisition monies from print to electronic materials, new complexities of pricing models and licensing, and financial pressures are relevant to libraries more broadly. To put FCL’s efforts into context, this study examines how other academic library consortia are licensing and acquiring electronic books, databases, journals and streaming media. Are other consortia (as ULC and Hazen suggest is the future for academic libraries) focusing on and benefiting from economies of scale and a centralized purchasing authority? Do they offer FCL organizational and financial models for greater consortial electronic resource cooperative collection development (CCD) and acquisitions? To address these questions, the organizations, activities, processes, histories, and trends of e-resource acquisitions and collection development at the Colorado Alliance of Research Libraries (CARL), Orbis Cascade Alliance (OCA), Triangle Research Libraries Network (TRLN), and Washington Research Library Consortium (WRLC) are presented with data collected. Additional background is provided through a review of the literature and a discussion of current practices offers a sampling of the new directions academic library consortia are taking and the challenges they face.

Literature Review

Library Consortia

Cooperation has long been a tenet of libraries, and the history of library consortia and the activities in which they have engaged is well documented. Kopp traces the use of the term “library co-operation” in the literature back to the 1880s.⁶ Bostick names the TRLN one of the oldest academic library consortia,⁷ formed on the basis of a cooperative agreement signed in 1933 between the presidents

of the University of North Carolina and Duke University.⁸ Alexander described the development of consortia through key events from the Great Depression, World War II, and postwar growth of higher education and scientific research to economic pressures in the 1960s.⁹ Academic library consortia continued to form in the decades between 1931 and 1972, with the greatest growth spurt, 115 new consortia, occurring between 1961 and 1971.¹⁰ The growth and expansion of technological innovations, integrated library systems, and networked information since the 1970s brought new opportunities for library consortia. Kopp recognized another library consortial growth “resurgence” in the late 1980s and early 1990s due to a “confluence of several technological, fiscal, organizational, political and other streams.”¹¹ Allen and Hirshon attributed growth of academic library consortia in the 1990s as a collaborative response to increased economic pressures from reduced state funding for public universities and tuition increases at private institutions, changes in the publishing industry, and growth of information technology.¹² These economic pressures have continued to intensify.

By the 1990s, academic libraries were struggling to keep pace with burgeoning resources published in print when electronic resources were added to the mix. As electronic resources moved from standalone workstations to local area networks and then a broader networked information environment, publishers continued to introduce new products for libraries. However, many libraries found they could not afford these new products on their own.¹³ State funding provided a jumpstart to financing early academic library consortial database licenses. OhioLink licensed four abstracting and indexing databases in 1990.¹⁴ The Virtual Library of Virginia (VIVA) provided the first databases to its public and private academic library members in 1995.¹⁵ The Illinois Digital Academic Library (IDAL) formed in 1999 to provide resources and services to 150 public and private academic libraries in the state, including a package of EBSCOhost full-text databases.¹⁶ In 1998, OhioLink started offering the Electronic Journal Center, a collection of Big Deal e-journal packages from Elsevier, Academic Press, Kluwer Academic, Springer-Verlag, and John Wiley & Sons available to all its membership.¹⁷

Throughout the literature on library consortia, the formation of the International Coalition of Library Consortia (ICOLC) in 1996 was recognized as a milestone in consortium development. Though a loosely affiliated and informal organization, ICOLC holds two meetings a year “dedicated to keeping participating consortia informed about new electronic information resources, pricing practices of electronic information providers and vendors, and other issues of importance to directors, governing boards, and libraries of consortia.”¹⁸ ICOLC issues statements on behalf of its members to express common values and positions. Two statements of relevance to this study are the “Statement of Current

Perspective and Preferred Practices for the Selection and Purchase of Electronic Information” (March 1998),¹⁹ and the “Statement on the Global Economic Crisis and Its Impact on Consortial Licenses” (January 19, 2009; revised June 14, 2010).²⁰ Among the points from the 1998 statement that Allen and Hirshon highlighted were higher expectations of libraries despite stable budgets, the undermining of fair use in the electronic environment, the necessity of changes to the scholarly communication system, and the unsustainable pricing practices of publishers.²¹ Alexander credited the creation of ICOLC with forcing publishers to take consortial purchasing groups more seriously and to negotiate with them.²² The more recent statements issued as a response to the 2008 economic crisis state a case for the serious and long-term implications to library budgets and advocate for pricing restraint, continued access to content through multiple providers, and flexibility of terms for content, contract durations, payment timetables, and opt-out and cancellations.²³ From ICOLC’s first meetings and a survey in 1997, Allen and Hirshon identified license negotiations and influencing pricing models for electronic resources as primary issues for library consortia.²⁴ Perry reported in her 2009 survey of consortia that their most important issue was renegotiating licenses, followed by budget management and licensing new acquisitions. Budget management and license negotiations (both new and renewals) were projected to be the most important issues in the future.²⁵ Priorities for consortia had not changed much since ICOLC was first formed, but they continued to be relevant. Between 2000 and 2009 membership in ICOLC increased by 56 percent,²⁶ demonstrating through sheer participation growth that the perceived value of libraries joining together to better achieve their goals remained strong. CARL, OCA, TRLN and WRLC are all ICOLC members.

Library consortia have many organizational models. Perry wrote, “Vendors and publishers are very well aware that every single consortium is unique in terms of its mission, funding sources, staffing patterns, priorities, membership, history and so forth.”²⁷ Library consortia can be organized and governed in many ways, from loosely aligned groups with no membership dues or designated staffing to highly centralized membership organizations. Perry’s 2009 survey identified a very small percentage (4.8 percent) of consortia with no paid staff and 19 percent with more than ten staff members.²⁸ Geography, discipline (medical, law), users (public, research, liberal arts), size, funding source (private, public or both), or a combination of these factors may be the binding forces of a consortium. Allen and Hirshon group consortia into four basic types: loosely knit federation, multi-type/multi-state network, tightly knit consortium, and centrally funded statewide consortium. These represent a continuum of local consortia with decentralized funding and staffing to centrally staffed, funded, and administered state consortia. Each type has varying degrees of local library autonomy and

consortial flexibility, which are important attributes that contribute to a consortium achieving its goals.²⁹

Cooperative Collection Development

The notion of libraries working together to provide more comprehensive collections of print materials than any one library could acquire alone is well established. Landesman and Van Reenan wrote the following:

Consortia are regarded as an effective strategy to increase the buying power of individual libraries over the short term and as an opportunity to maximize opportunities for cooperative collection building and for resource sharing over the long term. They offer libraries the ability to give users the access they are coming to expect and demand to a much broader range of materials than any one library could possibly offer.³⁰

Cooperative collection development (CCD) efforts began with print resources and have evolved more recently to focus on electronic resources. Dominquez and Swindler provide a history of CCD among the TRLN libraries dating back to the 1930s and a summary of recommendations for a successful program. A key to collaborative success is building on the institution's self-interest to benefit its users with better service and broader, interdependent collections of unique and distinctive research titles.³¹ Other factors cited as important to a group's successful collection development efforts are common goals and a clearly articulated plan, institutional and library administration commitment and leadership, good access to bibliographic records, an effective delivery system, and effective communication and trust between administrators, faculty, and librarians. TRLN demonstrated these qualities and continues to be an innovator in CCD. It experimented with a joint approval plan for print monographs to explore, among other things, the benefits of acquiring more titles across the consortium while diverting funds from individual library approval plans to other materials.³²

Fundamental to the practice of CCD in the print universe is the division between a core set of heavily used materials owned by each library and unique, less used materials purchased by selected libraries with the intention of sharing with its partners. Shreeves wrote the following:

A research library . . . will develop collections of "peripheral" material in selected areas that respond to local priorities but also serve consortial needs. This collection, in turn is backed up by the collections of consortial partners built through distributed responsibility for peripheral materials in complementary fields.³³

Despite many incentives, CCD of print resources does not have a history of widespread participation. The loss of local autonomy over collection decisions, competition between higher education institutions, time required to cooperate effectively, and fear of losing acquisition budget allocations have been some of the barriers. In the past decade, research libraries have shifted their focus from CCD of prospective materials to collection management of existing materials in shared depositories.³⁴ Ongoing demands on library spaces and budgets, as well as the shift to digital formats and the need to preserve physical materials, are bringing libraries together with a new urgency to deal with their print legacies.

CCD of electronic resources is fundamentally different from print materials in important ways. First, consortia are primarily focused on acquiring resources that are in high demand for all or multiple members, creating collections of e-resources held wholly or partially in common rather than distributing acquisitions of little-used materials among individual libraries. Shreeves notes, "Even when this is research-intensive information, the ability to provide access from anywhere makes it far more shareable than the peripheral material that was the traditional object of cooperative collection development."³⁵ In theory, online access eliminates barriers of space and time, though in practice this accessibility has been limited by a second major difference. Publishers have required libraries to sign contracts covering terms of access before allowing connections between library users and online content. They have also sought to override fair use protections and right of first sale with license terms that restrict what libraries and their users can do with the content. Librarians have been concerned with protecting and extending use rights to the online environment, and their ability to do so has been a factor in determining whether or not a resource is suitable for acquisition.³⁶ They have been largely successful with protecting library rights to share journal articles, but e-book content has been a different matter. Digital rights management mechanisms and contract terms have effectively undermined sharing of e-book content among consortial partners.³⁷

Acquisitions approaches

With the emphasis consortia give to licensing negotiations and pricing models, an overview of the methods and models for acquiring electronic resources is warranted. As previously noted, beginning in the 1990s, consortia engaged with publishers to obtain access to their journal titles in various permutations, most famously the Big Deal of a collection of journals with pricing based on the print subscription costs of the combined membership plus an online access surcharge. Consortia also contracted with vendors who provided aggregations of content from various publishers in full-text

databases. A consortium acted as a buying agent to achieve a better product price for a group of libraries than any individual library could get, as long as a minimum number of libraries participated, or a consortium purchased an electronic product to which all members had access.³⁸ Since then, the players and methods have become increasingly complex, particularly with the advent of electronic books. Delquie and Tucker identified subscription agents, publishers, aggregators and consortia as the partners with which individual libraries can work to procure content.³⁹ Similarly, consortia can also partner with subscription agents, publishers and aggregators to negotiate licenses on behalf of their members. The current business models are plentiful and range from leases for temporary access to outright purchases with perpetual ownership. Pay-per-view (articles) and patron driven acquisitions (e-books) enable libraries to offer users wider access to content without paying for a complete collection up front. Publishers are attracted to the potential of greater sales by putting more materials out for discovery by users. A usage-based model enables access to a collection of journals or books for a flat annual fee, with additional payment based on usage of specific titles or articles at the end of a designated period. This combines the benefits for publishers of a steady stream of income and incremental additional income, a model Joseph Esposito argues is far more palatable and cost effective for publishers than the high costs of per-unit sales.⁴⁰

Some of the most dynamic arrangements are developing in agreements for e-books, and consortia are engaged in pilot projects to determine which best meet the needs and goals of their group and member libraries. TRLN has contracted with Oxford University Press (OUP) and YBP Library Services (YBP) to purchase e-books for a joint collection.⁴¹ CARL worked with EBL, ebrary, and YBP, and OCA worked with EBL and YBP for demand-driven acquisitions (DDA) of titles from multiple publishers.⁴² As consortia have engaged in electronic resource collection development and acquisitions over the past two decades, advantages and challenges have emerged.

Advantages of Consortial E-Resource Activities

The greatest advantage to libraries participating in consortial contracts for licensed electronic resources is that jointly they can provide access to content that many could not afford individually. Clement reported from her 2006 survey of ninety-two consortia that member ability to deliver more content to users was the greatest benefit of consortium participation.⁴³ Seventy-one percent of Boston Library Consortium members responded to a survey that access to large publisher e-journal packages was only affordable to them through a consortial arrangement.⁴⁴ OhioLink members

offered their users more databases, streaming videos and audio, and e-books because of participation in the consortium.⁴⁵ Kohl and Sanville made the case that the journal packages to which OhioLink subscribed provided an average of four times more titles to users at its university libraries, a twentyfold increase for four-year liberal arts colleges and an even greater increase for community colleges.⁴⁶ By providing access to more content, consortial libraries are giving their users more choice and selection authority through more full-text or media content in e-journal packages and databases or through metadata for e-books. Kohl and Sanville highlighted the relative value of the collection cost/benefit ratio given the usage of titles in the OhioLink e-journal packages, especially the new titles added beyond the previously subscribed to journals.⁴⁷ Consortial member libraries have paid more for the “Big Deal” e-journal packages than they did for their print subscriptions or even individual e-journal subscriptions. The trick is that they pay far less per title and have access to many more titles in the packages. Publishers have cleverly priced these packages and consortial “deals” so they receive more income by increasing participation. Individual libraries “pay to play” where they could not before and in the process spend higher percentages of their acquisitions budgets on e-resources.

Throughout the history of consortia, cost savings have been touted as a benefit of cooperative collection development, but in fact, cost sharing and containment more accurately describes the reality. Beyond achieving greater access to e-resources for less money than individual libraries would pay, consortia are valued for their ability to negotiate with content providers from a position of strength, whether for better license terms, better discounts, or lower annual price increases. Landesman and Van Reenan noted that many consortia will not deal with vendors who place limits on user access to their products.⁴⁸ Several survey results recognized the benefits of consortial staff engaging in license and pricing negotiations.⁴⁹

Consortia also play an advocacy role for e-resource collection development and acquisitions, as TRLN has with its “Beyond Print” project “to develop new business models and licensing terms for the cooperative acquisition of e-books” (www.trln.org/BeyondPrint) and the OCA has with its DDA pilot for e-books. These consortial initiatives are exploring new territories for CCD in the face of restrictions on e-book sharing imposed by publishers. James Brunelle of Lewis and Clark College said this of the OCA e-book pilot:

My main hope was that the project would lay the foundation for a new type of cooperative e-book collection that would be centrally funded and easily accessible by all members . . . the more that e-book collections grew at the local level in individual libraries, the more we undermined the types of

cooperative collection development projects taken on by the CDMC (OCA Collection Development and Management Committee). Building up robust, locked-down localized e-book collection is totally counterproductive and hurts the Alliance's consortial leveraging power.⁵⁰

Working with publishers and vendors, consortia can bring their members and library users the benefits of more content that is also more accessible.

Challenges for Consortial E-Resource Collection Development and Acquisitions

Consortial activities on behalf of member libraries are often forged from strong relationships and conflicting demands. A commitment to participate in a consortial deal reduces a library's local autonomy and flexibility by limiting acquisition funds available for materials that best match institutional priorities or specializations. This is notably true for the Big Deal e-journal packages that often involve multiyear licenses with escalating cost commitments.⁵¹ Particularly since the 2008 financial crisis, institutional allocations for library acquisition budgets have been cut in real dollars and in relative terms because of inflationary costs of materials purchased, so the higher costs of e-resources purchased through consortia further limit local spending autonomy. Academic library consortia members confirmed these tensions between paying for their consortial e-resource commitments and maintaining budgets for their local acquisitions. Libraries may choose not to participate in new consortial deals to retain some flexibility. Perry reported that more commonly, consortia are focusing on renegotiating existing deals to derive some savings to balance their shrinking budgets.⁵²

Another commonly cited cost of participating in consortia is that of labor, both on the part of librarians and consortium staff. Publishers and vendors prefer to deal with consortia because they can make higher dollar value sales by working with one representative group. As a result, consortium staff are bombarded with offers for products, and many have complex and varied pricing models. Westmoreland and Shirley wrote, "Consortial pricing must protect the vendors' current revenues while simultaneously developing new business. The result is often a complex price quote that lays the burden of developing equitable member cost-sharing structures on the consortium."⁵³ The larger a consortium becomes, the more time staff must spend communicating, tracking, and processing acquisitions, which in turn increases overhead costs. To be thorough, publishers market the same offers, and different ones, to librarians (and often multiple librarians) at individual libraries. Library staff spend more time communicating with colleagues within their own

library and the consortium about policies, offers, acceptable license terms, and technical and access issues than they do when dealing directly with a publisher or vendor. Whether e-resource products are managed by central staff or volunteers at member libraries, the workload is heavy. The South Central Academic Medical Libraries (SCAMEL) eventually formed a collection development committee to manage its collaborative e-resource purchases. Van Schaik and Moore wrote the following about SCAMEL:

Changes in personnel and structure of the Collection Development Committee happened for several reasons, but the major cause of both was the amount of work and time required to investigate new products, negotiate licenses, process renewals, communicate with membership and Board, maintain updated full-time equivalent counts and IP ranges for the consortium libraries, invoice, and plan agendas and meetings.⁵⁴

These issues are compounded because libraries are frequently members of multiple consortia, each with its own mandate or area of focus. Library administrators must maintain a broad view and match the benefits and strengths of each consortium with the library's service and resource priorities, often within limited means. This can result in competition between consortia, creating difficult choices for libraries.

In addition to multiple consortia, library administrators try to balance the demands of a volatile scholarly publishing marketplace. Consortia negotiate contracts with large publishers that sell bundled content, often produced by the academic institutions themselves, for fees to support publishing and sometimes scholarly society interests. Commercial publisher interest in ever-increasing revenues often conflict with budget constraints at academic institutions. Meanwhile, academic institutions and libraries work with faculty to retain their author copyrights and support open access initiatives to make scholarly communication more affordable and accessible. Landesman and Van Reenan outlined the basic conflict:

There is an [*sic*] basic discongruity between consortia and new scholarly initiatives. . . . Consortia and large publishers or aggregators work easily and well together; they have natural affinity. Scholarly publishing initiatives and small non-profit publishers find that they work most easily with individual libraries, librarians and faculty members.⁵⁵

As more library acquisitions budgets are consumed by consortial contracts with big publishers, libraries have fewer resources, both financial and human, to support smaller,

nonprofit publishers and experimental journals. The big publishers charging high prices tend to get more attention and promotion from libraries, crowding out the smaller scholarly publishers. Further, when publishers bundle their content, librarians are no longer selecting the highest-quality titles, but must take marginal offerings as well. Kohl and Sanville posited, "If all of a publisher's titles are purchased, the Darwinian quality of the marketplace as reflected by academic selection is defeated. An endless number of new journals could theoretically emerge without regard to academic quality or merit."⁵⁶ The good news is that consortia are increasing their focus on supporting open access and scholarly communications. Perry reported from the 2009 survey of library consortia that these issues ranked in the top five of current priorities.⁵⁷ Nurturing academic publishing quality and open access is in the mutual interests of libraries and consortia, but juggling competing workflows is a challenge.

Comparison of Target Group Consortia

Research Method

FCL is one among many library consortia pursuing e-resource CCD and acquisitions in the scholarly publishing marketplace. The purpose of this study was to gather details about how a representative sampling of academic library consortia with similarities to the FCL license electronic resources to identify potential models for further consortial electronic resource CCD and acquisitions. The author conducted a literature and website review of academic library consortia based on the following criteria:

- number of members
- mix of types of academic institutions (liberal arts, research, etc.)
- mix of size of member institutions
- geographic proximity of members
- consortium funded through member fees (not centrally or state funded)
- types of current consortium activities

Based on these criteria and a target group of four consortia to compare with FCL, the author selected as potential subjects CARL, TRLN, OCA, and WRLC. Because of their similarities to FCL and their representation in the literature for CCD initiatives, they were judged to be good potential models. Contacts were identified from staff rosters on their websites. Including FCL, all five consortia fit Allen and Hirshon's description of a tightly knit consortium that

has some of the flexibility of the loosely knit federation, but is not encumbered by the fragmentation of

membership of the multi-state, multi-type consortia. . . . There is typically some dedicated staff that coordinates program development, but does not really control that program. The organization may rely solely upon institutional funding, or may supplement their [sic] resources with foundation or other external funding. The consortium may share a virtual or online union catalog . . . there is more likelihood that tightly knit federations will develop a defined and beneficial programmatic agenda over time.⁵⁸

The author distributed via email sixteen open-ended questions (see appendix) covering organization, processes, and history and trends for electronic resource collection development and acquisitions to consortium directors or librarians responsible for these areas. The respondents were asked to reflect on whether they envisioned their consortium with a larger membership and a greater degree of centralization, and how their collection development and acquisitions activities had changed or might change in the future. They were asked to describe how collection development and acquisitions activities were conducted, what policies and guidelines were in place, the roles and responsibilities of consortium and member library staff, and what kinds of materials they licensed and with what access terms. The questions were designed to solicit both operational details and assessment of their e-resource acquisition programs. Related policies, statements and committee structures were collected from the consortial websites.

Results

Two consortia responded to the questions via email, one responded in a telephone interview, and the fourth provided a general response about current practices via email. The FCLC, comprising the library directors at Amherst College, Hampshire College, Mount Holyoke College, Smith College, UMass Amherst, and the executive director of Five Colleges, met with the author to discuss the questions. The author provided notes of the telephone conversation and in-person meeting (FCLC) to the participants for their review.

Consortium Characteristics

CARL (www.coalliance.org), FCL (www.fivecolleges.edu/libraries), OCA (www.orbiscascade.org/index/index), TRLN (www.trln.org/index.htm), and WRLC (www.wrlc.org) represent a range of membership and consortial activities. All include academic libraries at both private and public institutions. CARL, with thirteen members, is the only consortium in this study that includes a public library, the Denver Public Library. FCL includes four small, private liberal arts colleges and one large, public university. TRLN is the smallest

Table 1. Consortium Member Composition and Geographic Areas

Consortium	Year Founded	# of Members	Member Types	Geographic Area
Colorado Alliance of Research Libraries	1974	13	Community college, large public library, liberal arts/college, research university	Northern Colorado, Southern Wyoming
Five Colleges/Five College Libraries	1965	5	Liberal arts college, research university	Pioneer Valley, Massachusetts
Orbis Cascade Alliance	2003	37	Community college, liberal arts/college, research/university	Idaho, Oregon, Washington
Triangle Research Libraries Network	1984 ^o	4	Research/university	Chapel Hill, Durham, Raleigh, North Carolina
Washington Research Library Consortium	1987	9	Research/university	District of Columbia

^o TRLN's first Memorandum of Understanding was signed in 1984, though participating libraries collaborated back to the 1930s.

with four members, which are all universities. OCA has the largest membership (thirty-seven libraries), covers the largest geographical area, and represents community colleges, colleges and universities of varying sizes. WRLC has nine members, all private universities with the exception of the public George Mason University and the University of the District of Columbia. Table 1 shows the number of members, year founded, type of members, and geographic areas of each consortium.

CARL was formed in 1974 and is governed by bylaws and a board of directors with representatives from each of the thirteen member institutions (all four University of Colorado campuses share one representative). Each member signed a memorandum of understanding (MOU) authorizing CARL to do business on its behalf, and each pays a prorated fee as assessed by the board of directors. Library directors at each member campus form the member council, which is the working committee of CARL and advises the board of directors. The executive director is the managing director of eight consortium staff who cover four major programmatic areas: the Prospector union catalog, the Gold Rush Electronic Resource Management System, the Alliance Digital Repository, and database licensing.

The FCL is one of the programmatic areas within Five Colleges, incorporated in 1965. Five Colleges has an executive director who serves on the board of directors with the four college presidents, the UMass Amherst chancellor and the UMass System president. The budget is funded by institutional assessments in equal shares, grants, two endowments, and other institutional arrangements. The FCLC, consisting of the library directors at each member library and the Five Colleges executive director, manages the FCL budget and coordinates library working committees and task forces. Current FCL projects include a shared integrated library system, a reciprocal borrowing program, and a shared depository. The shared library system coordinator

and depository staff positions are funded by the Five Colleges library budget.

The OCA is a result of the 2003 merger of two consortia originally founded in the 1990s: the Orbis Consortium (state and private colleges in Oregon and private and community colleges in Washington) and the Cascade Consortium (six publicly funded universities in Washington). A MOU was signed by the attorney generals of both Oregon and Washington to form the OCA as an entity of the University of Oregon. In 2011, the OCA was incorporated as a nonprofit 501(c)(3) organization. Its thirty-seven full members operate according to bylaws and a MOU. OCA business is overseen by the members council, and each full member has voting representation on it. The executive director is an ex officio member. The council votes for representatives on the board of directors. OCA programs and services are funded by member fees and other sources, as expressed in its financial framework.⁵⁹ OCA's current strategic agenda covers CCD, including a print depository; a shared integrated library system; collaborative technical services; digital initiatives, including a digital archive; and a discovery system.⁶⁰ A staff of seven, reporting to an executive director, supports these efforts.

Of the consortia studied, TRLN has the longest history of collaborative activity, dating back to 1933.⁶¹ The four members signed a MOU, and TRLN has a governing board consisting of the provosts and library directors from the four universities and the executive director. The organization has a staff of five to support its goals, and they report to the executive director. According to the "TRLN Principles of Cooperation," member libraries "are committed to the development of a comprehensive shared collection and integrated discovery services that are available to all students, faculty and staff at each institution."⁶² TRLN activities are funded by membership dues and grants, and each library contributes local funding for cooperative purchases and other TRLN programs. Aside from collaborative collection

Table 2. Consortium Governance, Funding, and General Activities

Consortium	Governance	Funding	General Activities
Colorado Alliance of Research Libraries	Memoranda of understanding, governing board	Member dues	Digital repository, e-resource management system, licensing, resource sharing, union catalog
Five Colleges/Five College Libraries	Incorporated, nonprofit 501(c)(3)	Member dues, grants	Integrated library system, licensing, print depository, reciprocal borrowing, resource sharing
Orbis Cascade Alliance	Incorporated, nonprofit 501(c)(3)	Member dues, service fees	Cooperative collection development, integrated library system (in development), digital depository, discovery system, licensing, resource sharing
Triangle Research Libraries Network	Memoranda of understanding, board of directors	Member dues, grants	Cooperative collection development, digital projects, discovery and delivery system, licensing, reciprocal borrowing, resource sharing
Washington Research Library Consortium	Incorporated, nonprofit 501(c)(3)	Member dues, service Fees	Digital repository, print depository, reciprocal borrowing, resource sharing, union catalog, virtual servers

development in many formats, TRLN engages in “reciprocal borrowing agreements and an expedited document delivery service, technology initiatives including a shared discovery and delivery system, joint projects in the areas of digital production, access and preservation, and a variety of human resources initiatives.”⁶³

The WRLC was incorporated as a 501(c)(3) nonprofit organization in 1987. The board of directors includes the provosts or chief information officers from member institutions and the chief financial officers of the three universities that made large contributions to the consortium’s reserve fund. The library directors council oversees general operations. Each institution has signed a member’s agreement. The budget is funded by member assessments that are based on institutional size and budget, as well as fees for additional services provided. An executive director manages a staff of eighteen. Current activities are focused on information technology infrastructure, including a shared catalog, institutional repository, digital collection infrastructure and virtual servers; resource sharing and reciprocal borrowing; and a shared offsite storage facility.⁶⁴ Table 2 provides a summary of the governance, funding and current activities of each consortium.

Organization of Collection Development and E-resource Acquisitions Activities

Electronic resource acquisition activities within these consortia, when supported, are managed through a variety of mechanisms (see table 3). WRLC is not currently licensing electronic resources on the behalf of its members. All others have some form of collection development or management committee with representation from each member library that is generally responsible for considering and recommending joint purchases of e-resources, with the exception of TRLN. TRLN’s electronic resources committee, which

consists of representatives from each library, coordinates activities with subject selectors and collection development staff at each campus. This committee works under the purview of TRLN’s collection council. CARL, OCA, and TRLN have designated consortia staff who support e-resource acquisitions. These consortium staff positions are funded by member dues. FCL does not have dedicated consortium staff but uses the Shared Electronic Resources Management Committee (ShERM) to coordinate the licensing, implementation, and evaluation and renewal activities for the databases it acquires jointly. ShERM has representation from each library, and the Five College Libraries integrated library system coordinator chairs the group.

Member libraries of all the five consortia in this study also license electronic resources through other consortia or buying clubs and determine which offers to pursue on the basis of price and terms. Carolina Consortia, Colorado Library Consortium, Greater Western Library Alliance (GWLA), LYRASIS, Northeast Research Libraries (NERL), Oberlin Group, and Westchester Academic Library Directors Organization (WALDO) are some of groups mentioned with whom member libraries work for e-resource acquisitions. Conversely, OCA represents nonmember libraries who want to participate in an e-resource product deal, and they pay a fee for the service in addition to the shared cost of the product.⁶⁵

Processes

Acquiring electronic resources with a variety of access models for a community of libraries involves many parties who perform numerous discrete and interrelated functions. The consortial contacts in this study described different ways a joint database, e-journal package, or e-book purchase may be initiated. Librarians at member libraries within CARL, FCL, OCA and TRLN suggest resources to their

Table 3. Consortium Organization for Electronic Resources Activities

Consortium	E-resource/ Collection Development Coordinating Group	Consortium Staff Dedicated to E-Resources	Licensing Contact/Contract Signatory	E-Resources Currently Acquired
Colorado Alliance of Research Libraries	Shared collection development committee	yes	Manager of database licensing/ executive director	Databases, e-books, e-journals, reference works
Five Colleges/Five College Libraries	Collection management committee	no	Member representative librarian or executive director/executive director	Databases
Orbis Cascade Alliance	Collection development and management committee	yes	Electronic resources program manager	Databases, e-books, e-journals
Triangle Research Libraries Network	Electronic resources committee	yes	Electronic resources committee/ member institutions	Databases, e-books, e-journals, reference works, protocols
Washington Research Library Consortium	N/A	N/A	N/A	None

representative on the managing committee. The committee then gauges interest among the collective members. Alternatively, the committee itself may discuss offers that come to it from vendors, consortium staff (CARL, OCA) or administrators. Criteria that determine with which vendors to work start with discounted pricing and financial savings for consortium members. Availability of resources and interface (FCL), established relationship and history (OCA), and license terms (OCA and TRLN) were mentioned as other factors that influence the choice of vendor partners. TRLN has licensing principles and guidelines endorsed by the TRLN executive committee, which serve as a benchmark for the electronic resources committee.⁶⁶

Price and license negotiations are handled differently among the consortia. CARL's manager of database licensing and OCA's electronic resources program manager are the positions responsible for negotiating pricing and license terms with vendors, though the executive director reviews and signs contracts for CARL. OCA's e-resources program manager conducts the initial review of a license and solicits feedback from participating libraries. At FCL, the collection management committee representative from the member library that "champions" the resource leads the price and license-term negotiations, consulting with representatives from the ShERM and the reference, instruction and outreach committee. However, in some cases, the executive director of Five Colleges spearheads negotiations if there is a price advantage to this approach, and this position is the signatory authority for Five Colleges contracts. At TRLN, members of the electronic resources committee coordinate with the appropriate parties at their institutions to negotiate terms acceptable to their libraries. TRLN cannot sign licenses on behalf of its members; each member institution ultimately signs the license for a product.

CARL, OCA, and TRLN are all currently acquiring

databases, e-journal packages, and e-books (publisher packages or DDA programs) for their members. Members opt in to participate in the database and e-journal package offers based on whether the product meets their local collection needs for a cost they can support. Access models run the gamut from lease to own to pay-per-view and single user, multi-user and site access. FCL currently leases only databases on behalf of its members on an opt-in basis.

OCA and TRLN have statements about one collection for the consortium and a "comprehensive shared collection,"⁶⁷ but databases and e-journals licensed by one library are not available to users at other institutions in the consortium that do not also license it. CCD and the principle of shared access to e-resources are constrained by the license terms. R2 recommended to FCL that they jointly license a core collection of shared e-resources across the member libraries but this has been largely unrealized because of the higher costs of jointly licensing resources. OCA and TRLN are working to overcome license limitations with their e-book pilot programs, which enable all member libraries and their users access to the e-books they license. However, these agreements are not "opt in" for each library; rather, participation is required.

While overhead costs of staff, facilities, etc. at CARL, OCA and TRLN are covered by member fees, acquired electronic resources are paid for separately by those libraries that participate in the agreement. The vendor sometimes charges a flat rate to the consortium, which then divides the cost according to a predetermined formula. FCL uses a tiered "elevenths" formula that weights each library's contribution; OCA uses a formula that factors a percentage flat rate, a percentage based on full-time equivalent enrollment, and a percentage based on materials budget. More often, the vendor determines what each participating library will pay on the basis of use, full-time equivalent enrollment,

Carnegie classification, or other factors. CARL and OCA receive and pay vendor invoices, then charge each participating library its contribution. If a vendor bills TRLN directly, it will collect payments from participating libraries. FCL pays vendor invoices and then charges back to participating libraries. However, vendors usually send invoices directly to the participating TRLN and FCL libraries for payment. Underpinning all these scenarios is a presumed cost savings reaped by each library working through the group to provide access to more content than could be offered by an individual library dealing directly with the vendor.

History and Trends

Libraries have been acquiring electronic resources in different formats for about twenty years, and the roles that consortia have played in the processes have changed over time. When databases were locally mounted and then transitioned to the web, WRLC licensed electronic resources on behalf of its members, but it has since ceased providing this service. The consortium priorities shifted to information technology infrastructure, resource sharing, and offsite storage, as WRLC thought it would achieve better e-resource cost savings through larger consortia. OCA has seen its database and e-journal package license activities mature, with fewer libraries participating in new deals. License terms for these products have also become more standard, though new issues such as text mining rights continue to emerge. Most of the consortial work is currently renewals of existing database and e-journal package contracts for which pricing models continue to evolve. TRLN members also recognize greater cost benefits through larger consortia and license fewer database and e-journal packages through TRLN now than in the past. New licenses cover different products, including e-book subject collections, protocols, and reference works. CARL continues to see growth in the e-resource acquisition services it provides to its members, and it is instituting a consortial electronic resource management system (ERMS) to support the myriad tasks it performs on their behalf. FCL continues to concentrate on acquiring databases that bring benefit to as many members as possible. It has also jointly acquired bibliographic records for common collections such as Early English Books Online (EEBO) and government documents.

The consortia count a number of successes coming from their e-resource acquisitions activities. FCL and TRLN specifically noted the beneficial working relationships engendered by the consortium committees. Improved communications and workflows have positively influenced existing workflows and laid the foundation for the consortium to take advantage of new opportunities. OCA recognized the benefits of building positive relationships with vendors. CARL and OCA cited the substantial increase in dollar

value of products they license for their members. CARL also noted the increase in libraries' access to reference works and e-journals because of consortium deals. TRLN and CARL named better license terms they negotiated, from e-book interlibrary loan provisions to reasonable inflation caps and cancellation allowances.

Over time, these consortia have found their niche in what e-resource acquisitions they can do best for their members. Each one is also looking at the e-book marketplace as the next frontier. CARL, OCA, and TRLN have already ventured into it; FCL and WRLC are examining options. They are all seeking ways to build on their resource-sharing and direct-borrowing activities with print monographs as the medium changes.

Experience has also brought lessons. While most of the consortia acknowledged a more stable and standardized environment now than five years ago, OCA reported that vendors seem less flexible with their offers than in the past. CARL and TRLN noted that e-resource licensing is very labor-intensive, with work required from both consortium staff and individual library staff members. TRLN has tried to use smaller teams to work out the larger deals. CARL saw the need to build communication between collection development and cataloging people earlier in the licensing process to raise awareness about access issues during implementation, before the agreement has been signed. FCL has struggled with the challenge of users' expectation of access to the same e-resources across the consortium. Addressing that expectation—for example, expanding licenses to create a larger “core” e-library as R2 had recommended—increases the cost per item and detracts further from individual library acquisitions budgets. Five College institutions are more attentive to local needs (i.e., budget) or global issues (i.e., scholarly communication) than consortium needs, thus making it more difficult to invest in shared resources. CARL also acknowledged that some libraries still pursue individual licenses for e-products before approaching the consortium to investigate a better deal for the group.

Discussion

The ULC described library consortia with central purchasing authority as one means for disrupting the current scholarly publishing model:

Most academic libraries are involved in consortial partnerships in which resource, service, and infrastructure costs may be shared. Contacts from libraries, publishers, and vendors alike reported that truly substantial savings require a greater degree of both financial and organizational centralization, as well as a larger membership (e.g., a large

university system or an entire state) than is typical with most consortia. Many contacts are planning to share an increasing number of resources and back-end systems among institutional partners soon.⁶⁸

The consortia in this study share resource, service, and infrastructure costs to some degree. They have developed their shared governance and organizational structures to carry out their programmatic objectives. They have a demonstrated history of commitment and success in their different collaborative endeavors, and they have supported a wide range of programs and initiatives. These factors contribute to their consortial cultures. However, with the exception of the OCA, none have a large membership and none are centrally funded. OCA (ILS) and CARL (ERMS), the two largest consortia in the study, are actively developing common back-end systems to better manage their collective resources, and both have the most active e-resource licensing programs. These two consortia are closest to approximating the ULC vision and their representatives agreed with this statement.

The consortia in this study have had successes with e-resources collection development and licensing consistent with those described in the literature: providing greater access to resources than those available to the members individually; developing stronger relationships with staff and vendors; and in some cases, influencing vendor offers and containing costs. The four consortia that are licensing e-resources break out into the two “big” (CARL and OCA) and the two “small” (FCL and TRLN) but regardless of size, each consortium has added value to its members’ e-resource collections in ways that reflect its history, culture, and collection vision. For TRLN in particular, this includes a longstanding commitment to CCD. People at each of the consortia spoke to the evolution and improvement of their processes and relationships.

The challenges that these consortia face have also been previously documented: competing interests of multiple consortia, time and labor demands of functioning in a complex environment, conflict between local interests and consortium goals, and tight budgets constrained further by consortium commitments. FCL has among its members one large research library and four small liberal arts colleges, and while the research library historically and geographically aligns well with the four colleges for direct borrowing purposes, its electronic resource and resource sharing needs are better matched with larger consortia with other research libraries. This disparity of size and academic focus of members is unique among the consortia in this study (CARL and OCA have clusters of smaller and larger members), but it serves as an example of how individual library needs are supported by more than one consortium.

Library and consortium staff have to assess the needs of their constituencies, review and negotiate product pricing and terms of use from various publishers and vendors,

consider implications to their budget, their users and other consortial commitments, and coordinate between the various internal and external partners. Contacts at CARL, OCA, and TRLN acknowledged the intensity and difficulty of this labor, and these are consortia with central staff dedicated to supporting the e-resource licensing tasks. Unlike the other consortia in this study, FCL does not have staff in common to support these efforts, but it has the fewest shared licenses. The success of the cooperative e-resource licensing programs inevitably relies on staff labor at each member library and the coordinating mechanisms each consortium has in place. Making a commitment to shared e-resources in an environment with fixed labor and acquisitions budgets means that something else cannot be done or acquired locally, unless other system efficiencies are found. FCL and TRLN share few information technology systems. If the culture of collective e-resource acquisitions is not strong, libraries are more likely to pursue their individual constituency needs first, especially when monies are not pooled. The paradox is that the tighter the budgets, the more libraries are reluctant to participate in shared deals because they consume a greater proportion of their monies, thus giving them less local flexibility. Similarly, converting to shared management systems, while potentially reaping cost savings in the long run, requires more financial investment in the short term.

The reality for the smaller consortia—FCL, TRLN, and WRLC—is that “substantial savings” are not within their sights, at least through collaborative e-resource acquisitions and management. WRLC invests many of its collective financial resources in shared IT infrastructure but recognized its limitations and withdrew from providing licensing services to its members. TRLN targets niche e-resources not available to its members through other consortia or e-journal packages it wants to provide in common to its members while using its experience in CCD to experiment with expanding its collective e-book holdings. It is adapting its CCD approach in the e-resource environment to negotiate multiple licenses for unique materials that benefit all its members, though likely at a higher cost than purchasing one item and physically sharing it between users at other libraries, as is done with CCD for print materials. The TRLN libraries share discovery and delivery platforms, but each library maintains separate integrated library systems, e-resource management systems, OpenURL resolution services, and discovery instances. Cost savings are unlikely either from back-end system efficiencies or an increase in membership.

FCL has done less e-resource CCD than other consortia in this study, with the exception of WRLC. It has struggled to implement R2’s recommendations for allocating a shared e-resources budget, maximizing the number of resources licensed in common and bringing e-resources staff together to manage them.⁶⁹ R2 acknowledged that cost savings might

not be an outcome, and FCLC may have pursued more databases under a joint license for the benefit to FCL users of a common, core collection. However, the increased cost of doing so has delayed implementation of this recommendation. Though the libraries share an online catalog, each library maintains its own catalog and acquisitions records, with a few exceptions. The four colleges adopted a different discovery layer than the university; UMass Amherst participates in another, larger consortial resource-sharing program that includes a different discovery layer. Individual library and institutional initiatives continue to take precedence as each determines how it wants to influence the scholarly publishing marketplace and allocate its acquisitions and personnel budgets. UMass Amherst library staff are unionized and library staff at the four colleges are not. A culture of plenty and independence is also difficult to overcome. The Five Colleges executive director noted that it is easier to centralize financial and staff resources from the outset of consortium founding than mid-stream, especially when necessary organizational supports come from parts of existing jobs at the different libraries.⁷⁰ Nevertheless, the FCLC continues to seek common ground among the member institution self-interests and initiatives.

The state of cooperative affairs as described by the ULC and Dan Hazen, where academic libraries are bound together more completely throughout their organizations, is more a vision than a reality in the realm of shared electronic resources. The larger of the consortia studied, CARL and OCA, have had the most broad-based participation and success in cooperative e-resource acquisitions and management. OCA, the one truly large consortium examined in this study, is moving in the direction of realizing the vision by pursuing shared electronic collections and management systems. As Brunelle noted, through their e-book initiatives, OCA is experimenting with a centrally funded, core e-book collection for all its members.⁷¹ The smaller consortia seem to be giving priority to those areas less fraught with the complications of licensing and the scholarly publishing marketplace, such as shared storage facilities, digital repositories and resource sharing. TRLN is a leader in the movement to provide a core collection of e-books to all member libraries, and FCL is taking deliberate steps to provide e-book records in common for a DDA program.

Electronic resources consume more and more of acquisitions budgets, and the world of academic information is not getting any smaller. Licensing electronic resources collaboratively increases access for member libraries, but it also increases costs for smaller consortia that cannot bring economies of scale to bear. Smaller consortia members have difficult choices: increase access while also increasing consortial spending, or maintain access and individual library budget autonomy. If and how small academic library consortia and their members are transitioning to cooperatives through which they can truly take advantage of economies

of scale, and the consequences if they do not, are questions for another study. A related area for further inquiry is the potential effects on the scholarly publishing marketplace of a higher percentage of library acquisition monies expended on e-resources licensed jointly.

Conclusion

University and library leaders across the country, as well as Five College campus leaders, have called for greater cooperation between libraries as a means of increasing efficiencies and reducing costs. The FCLC hired a consulting firm to identify ways that the libraries could collaborate more closely. One of the areas targeted was the acquisition and management of electronic resources. The purpose of this study was to explore if and how academic library consortia with similarities to the FCL have realized cost savings and management efficiencies through CCD and a centralized purchasing authority and licensing for e-books, databases, journals, and streaming media. The challenges of CCD with print resources have been multiplied by complicated new pricing schemes and licensing requirements of electronic resources. The demands on staff are much greater. Database and e-journal package acquisitions have stabilized, and the majority of staff work is on renewals. That said, pricing schemes continue to evolve and many renewals are not pro forma. With time and experience, consortia and library staff have improved their communication and workflows, but they have not realized labor savings.

The consortia with the most members, CARL and OCA, offer their member libraries the greatest resource cost sharing and containment. Their economies of scale produce financial benefits for their members. The smaller consortia, TRLN and FCL, are in fact paying more to provide shared access to electronic resources. Contrary to the ULC proposed means of achieving substantial savings, none of the consortia studied have truly centralized purchasing authority.

Each consortium in this study has its unique culture that will either enable or inhibit its future efforts. The scholarly publishing paradigm is shifting, and academic libraries must work with publishers and faculty in different ways. All consortia recognize the e-book marketplace as a critical mutual interest and future focus because current e-book license restrictions undermine other common and historical consortial services: direct borrowing privileges and resource sharing. Among the Five Colleges institutions, a common or coordinated approach to influencing this market has not been adopted. CARL, OCA and TRLN are making concerted efforts to shape how scholarly publishers are selling e-books, though each in its unique way. The smaller consortia are struggling with their members to commit their local financial and personnel resources, or leverage the ones they

have, to acquire and manage e-resources in ways that deliver widespread benefits.

The complexity and volatility of the scholarly publishing marketplace, the strength of individual institutional interests, and financial constraints have created a potent brew. Only the two larger consortia surveyed, CARL and OCA, spoke of adding more members to achieve greater economies of scale, pursuing a centralized purchasing authority or sharing more back-end systems. Small academic library consortia are unlikely to see operational efficiencies and cost savings without increasing memberships and financial investments in consortial e-resource management. If their member library acquisitions budgets do not increase, they will face limitations on their renewals and new purchases. How they manage their consortial alliances, their commitments to collaborative e-resource acquisitions and management, and their roles in the broader scholarly publications environment may determine to what degree they achieve their collective goals in the future. TRLN provides FCL with one model for CCD and acquisitions of electronic resources, but this model is not consistent with the vision provided by the ULC.

References and Notes

1. University Leadership Council, *Redefining the Academic Library: Managing the Migration to Digital Information Services* (Washington, DC: The Advisory Board Company, 2011), x.
2. Dan Hazen, "Rethinking Research Library Collections: A Policy Framework for Straitened Times, and Beyond," *Library Resources & Technical Services* 54, no. 2 (2010): 117.
3. R2 Consulting, "Five Colleges Shared Digital Collections—Phase One," final report, November 8, 2010.
4. *Ibid.*, 47–48.
5. *Ibid.*, 28.
6. James J. Kopp, "Library Consortia and Information Technology: The Past, the Present, the Promise," *Information Technology & Libraries* 17, no. 1 (1998): 8.
7. Sharon L. Bostick, "The History and Development of Academic Library Consortia in the United States: An Overview," *Journal of Academic Librarianship* 17, no. 1 (2001): 128.
8. Patricia B. Dominguez and Luke Swindler, "Cooperative Collection Development at the Research Triangle University Libraries: A Model for the Nation," *College & Research Libraries* 54, no. 6 (1993): 471.
9. Adrian W. Alexander, "Toward 'The Work of Perfection,'" *Journal of Library Administration* 28, no. 2 (1999): 2–5, doi: 10.1300/J111v28n02_01.
10. Kopp, "Library Consortia and Information Technology."
11. *Ibid.*
12. Barbara M. Allen and Arnold Hirshon, "Hanging Together to Avoid Hanging Separately: Opportunities for Academic Libraries and Consortia," *Information Technology & Libraries* 17, no. 1 (March 1998): 36–37.
13. Alexander, "Toward 'The Work of Perfection,'" 9.
14. "The Ohio Information and Library Network—History," OhioLink, accessed January 16, 2013, www.ohiolink.edu/about/what-is-ol.html#history.
15. "Ten Years of VIVA," Virtual Library of Virginia, accessed January 15, 2013, www.vivalib.org/10th.html.
16. Sam Brooks and Thomas J. Dorst, "Issues Facing Academic Library Consortia and Perceptions of Members of the Illinois Digital Academic Library," *portal: Libraries & the Academy* 2, no. 1 (January 2002): 43–44, doi: 10.1353/pla.2002.0005.
17. Glenda A. Thornton, "Impact of Electronic Resources on Collection Development, the Roles of Librarians, and Library Consortia," *Library Trends* 48, no. 4 (Spring 2000): 851.
18. "About ICOLC," ICOLC: International Coalitions of Library Consortia, accessed January 16, 2013, icolc.net/about-icolc.
19. ICOLC: International Coalitions of Library Consortia, "Statement of Current Perspective and Preferred Practices for the Selection and Purchase of Electronic Information," news release, March 1998, accessed January 16, 2013, <http://legacy.icolc.net/statement.html>.
20. ICOLC: International Coalitions of Library Consortia, "Revised Statement on the Global Economic Crisis and Its Impact on Consortial Licenses," news release, June 14, 2010, accessed January 19, 2012, <http://icolc.net/statement/revised-statement-global-economic-crisis-and-its-impact-consortial-licenses>.
21. Allen and Hirshon, "Hanging Together to Avoid Hanging Separately," 41.
22. Alexander, "Toward 'The Work of Perfection,'" 9.
23. ICOLC, "Revised Statement."
24. Allen and Hirshon, "Hanging Together to Avoid Hanging Separately," 41.
25. Katherine A. Perry, "Where are Library Consortia Going? Results of a 2009 Survey," *Serials* 22, no. 2 (July 2009): 124–25.
26. *Ibid.*, 123.
27. *Ibid.*
28. *Ibid.*, 124.
29. Allen and Hirshon, "Hanging Together to Avoid Hanging Separately," 38.
30. Margaret Landesman and Johann Van Reenan, "Consortia vs. Reform: Creating Congruence," *Journal of Electronic Publishing* 6, no. 2 (December 2000), doi: 10.3998/3336451.0006.203.
31. Dominguez and Swindler, "Cooperative Collection Development at the Research Triangle University Libraries," 485–87.
32. Kim Armstrong and Bob Nardini, "Making the Common Uncommon?" *Collection Management* 25, no. 3 (2001): 93, doi: 10.1300/J105v25no03_07.
33. Edward Shreeves, "Is There a Future for Cooperative Collection Development in the Digital Age?" *Library Trends* 45, no. 3 (1997): 373–90.
34. Samuel Demas and Mary E. Miller, "Rethinking Collection Management Plans: Shaping Collective Collections for the 21st Century," *Collection Management* 37, no. 3–4 (2012): 170, doi: 10.1080/01462679.2012.685415.

35. Shreeves, "Is There a Future for Cooperative Collection Development in the Digital Age?"
36. Thornton, "Impact of Electronic Resources on Collection Development," 847.
37. Sarah K. Lippincott et al., "Librarian, Publisher, and Vendor Perspectives on Consortial E-Book Purchasing: The Experience of the TRLN Beyond Print Summit," *Serials Review* 38 (2012): 4, doi: 10.1016/j.serrev.2011.12.003.
38. Thornton, "Impact of Electronic Resources on Collection Development," 850.
39. Emilie Delquie and Cory Tucker, "Moving Forward with Electronic Content Procurement," *Against the Grain* 23, no. 5 (2011): 22.
40. Joe Esposito, "The Stubborn Persistence of the Subscription Model," accessed January 18, 2012, scholarlykitchen.sspnet.org/2011/11/15/the-stubborn-persistence-of-the-subscription-model.
41. Rebecca Seger et al., "TRLN/Oxford University Press/YBP Consortial E-Books Pilot" (paper presented at the Charleston Conference, Charleston, South Carolina, November 8, 2012).
42. Michael Kelly, "Two Consortial Ebook Projects Move Deeper Into Demand-Driven Acquisitions," *Library Journal*, June 20, 2012, accessed June 21, 2012, www.thedigitalshift.com/2012/06/ebooks/two-consortial-ebook-projects-moving-deeper-into-data-driven-acquisitions.
43. Susanne Clement, "Skills for Effective Participation in Consortia: Preparing for Collaborating and Collaboration," *Collection Management* 32 (2007): 195, doi: 10.1300/J105v32n01-13.
44. Philip M. Davis, "Patterns in Electronic Journal Usage: Challenging the Composition of the Geographic Consortia," *College & Research Libraries* 63, no. 6 (2002): 484.
45. Laura Kinner and Alice Crosetto, "Balancing Act for the Future: How the Academic Library Engages in Collection Development at the Local and Consortial Levels," *Journal of Library Administration* 49, no. 4 (2009): 427, doi: 10.1080/01930820902832561.
46. David F. Kohl and Tom Sanville, "More Bang for the Buck: Increasing the Effectiveness of Library Expenditures through Cooperation," *Library Trends* 54, no. 3 (Winter 2006): 402, doi: 10.1353/lib.2006.0022.
47. *Ibid.*, 403–4.
48. Landesman and Van Reenan, "The Causes of Discongruity."
49. Kinner and Crosetto, "Balancing Act for the Future," 426; Clement, "Skills for Effective Participation in Consortia," 195; Christina Torbert, "Collaborative Journal Purchasing Today: Results of a Survey," *Serials Librarian* 55 no. 1–2 (2008): 175, doi: 10.1080/03615260801970857.
50. Jill Emery (contributor) and Bonnie Parks (column editor, *Serials Conversations*), "The Demand Driven Acquisitions Pilot Project by the Orbis Cascade Alliance: An Interview with Members of the Demand Driven Acquisitions Implementation Team," *Serials Review* 38, no. 2 (2012): 132–33, doi: 10.1016/j.serrev.2012.04.008.
51. Davis, "Patterns in Electronic Journal Usage," 484–85; Kinner and Crosetto, "Balancing Act for the Future," 429; Torbert, "Collaborative Journal Purchasing Today," 178.
52. Perry, "Where are Library Consortia Going?," 126.
53. Tracey Westmoreland and Beverley Shirley, "The State of Consortia: Promises to Keep," *Texas Library Journal* (Summer 2004): 54.
54. JoAnn Van Schaik and Millie Moore, "Group Purchasing by a Regional Academic Medical Library Consortium: How SCAMeL Made it Work," *Journal of Electronic Resources in Medical Libraries* 8, no. 4 (2011): 418, accessed December 11, 2012, doi: 10.1080/15424065.2011.626353.
55. Landesman and Van Reenan, "The Causes of Discongruity."
56. Kohl and Sanville, "Impact of Electronic Resources on Collection Development, the Roles of Librarians, and Library Consortia," 401–2.
57. Perry, "Where are Library Consortia Going?" 125.
58. Allen and Hirshon, "Hanging Together to Avoid Hanging Separately," 38.
59. "Orbis Cascade Financial Framework," Orbis Cascade Alliance, accessed January 29, 2013, www.orbiscascade.org/index/cms-file-system-action/board/policy/financial_framework_final.docx.
60. "Orbis Cascade Strategic Agenda," Orbis Cascade Alliance, accessed January 29, 2013, www.orbiscascade.org/index/strategic-agenda.
61. "History of TRLN," Triangle Research Libraries Network, accessed January 28, 2013, www.trln.org/history/trln.htm.
62. "TRLN Principles of Cooperation," Triangle Research Libraries Network, accessed January 29, 2013, www.trln.org/about/cooperation.htm.
63. Mona C. Coutts, TRLN executive director, email to the author, October 23, 2012.
64. Bruce Hulse, "Governance description," email to the author, January 29, 2013.
65. "Orbis Cascade Electronic Resource Nonmember Purchasing Program," Orbis Cascade Alliance, accessed January 30, 2013, www.orbiscascade.org/index/er-nonmember-purchasing-program.
66. Mona C. Coutts, "Triangle Research Libraries Network, 'Licensing Principles and Guidelines,' adopted by the Executive Committee," email to the author, December 2004.
67. Orbis Cascade Alliance Collection Development and Management Committee vision statement: "As an Alliance, we consider the combined collections of member institutions as one collection. While member institutions continue to acquire their own material, the Alliance is committed to cooperative collection development to leverage member institutions' resources to better serve our users." Accessed January 31, 2013, www.orbiscascade.org/index/strategic-agenda. Triangle Research Libraries Network Principles of Cooperation: "The TRLN member libraries are committed to the development of a comprehensive shared collection and integrated discovery and delivery systems that are available to all students, faculty and staff at each institution." Accessed January 31, 2013, www.trln.org/

about/cooperation.htm.

68. University Leadership Council, *Redefining the Academic Library: Managing the Migration to Digital Information Service* (Washington, DC: The Advisory Board Company, 2011), x.
69. R2 Consulting, "Five Colleges Shared Digital Collections—Phase One," 44–48.
70. Five College Librarians Council, in discussion with the author, December 17, 2012.
71. Emery and Parks, "The Demand Driven Acquisitions Pilot Project by the Orbis Cascade Alliance," 132–33.

Appendix. Research Questions for Academic Library Consortia

Organization

1. Is this statement from the University Leadership Council in the 2011 publication *Redefining the Academic Library: Managing the Migration of Digital Information Services* true for the Colorado Alliance/Orbis Cascade Alliance/Triangle Research Library Alliance/Washington Research Library Consortium:

"Most academic libraries are involved in consortial partnerships in which resource, service, and infrastructure costs may be shared. Contacts from libraries, publishers, and vendors alike reported that truly substantial savings require a greater degree of both financial and organizational centralization, as well as a larger membership (e.g., a large university system or an entire state) than is typical with most consortia. Many contacts are planning to share an increasing number of resources and back-end systems among institutional partners in the near future." (p. x)

2. Is the Colorado Alliance/Orbis Cascade Alliance/Triangle Research Library Alliance/Washington Research Library Consortium in a position to benefit from greater financial and organizational centralization for consortium acquisition of e-resources?
3. Do, or will, your members acquire e-resources via other consortia to benefit from cost savings? If so, are these purchases for collections held in common or by individual members?
4. How are e-resource collection development activities conducted and managed across the consortium? If you have consortium staff who participate in e-resource acquisition, how are their positions funded?
5. Are e-resources acquired as core, shared resources; to improve breadth of subject access across the consortium; or both?

Processes

6. What types of e-resources (databases, e-books, e-journals, streaming media, other?) have your consortium acquired on behalf of its membership in the past 5 years?
7. What policies and procedures guide the acquisition of e-resources for the consortium?
8. What access models (lease, own, pay-per-view; single user, multi-user, site; other) have you licensed?
9. How are e-resources recommended and selected?
10. On what criteria are vendor partners selected?
11. Who reviews and negotiates licenses with vendors? Do you have standard terms and an agreement on unacceptable terms?
12. How are e-resource acquisitions funded? How are costs shared? Are invoices paid to the vendor by member libraries or the consortium?

History and Trends

13. How have e-resource acquisitions changed in your consortium in terms of organization, products and processes over the past 5 years?
14. How do you anticipate they will change in the next five years?
15. What consortium e-resource acquisition programs would you consider successful in the past 5 years, and why?
16. What lessons have you learned and how would you recommend improving future ventures from a consortium standpoint?

Evaluating Library Discovery Tools through a Music Lens

Rebecca Belford

This paper outlines how to use specialized cataloging to evaluate discovery tools for library collections. An awareness of the capability offered by bibliographic records and data for specialized materials enables libraries to conduct their own evaluation of a discovery tool's functionality for complex materials. Bibliographic records for materials such as music are excellent for putting a discovery tool through rigorous testing. This paper may be used to facilitate evaluation of discovery tools by those without music cataloging expertise, and it provides a ready supply of examples to quickly identify complex search strategies.

Throughout this paper, the term *discovery tool* refers to products that meet the criteria of web-scale discovery. Concisely defined by Hoepfner, these are the central index, a preharvested central index of content, and the discovery layer, the user interface to the central index.¹ The meaning of *discovery tool* varies throughout the library literature and has, as documented by Caplan, changed over time;² vendors may refer instead to a *service* or *solution*. Little compares these to the online public access catalog (OPAC) and refers to these as “softer, gentler OPACs.”³ Discovery tools currently available to libraries include VuFind (open source, developed and maintained at Villanova University), Blacklight (open source), BiblioCore (BiblioCommons), Summon (Serials Solutions), Primo (Ex Libris), EBSCO Discovery Service (EBSCO), and WorldCat Local (OCLC).⁴

Central index coverage is variable and customizable. It includes a library's resources and may include local digital collections or institutional repositories, subscription databases, and external open access collections. It is the MARC records within a discovery tool's data that are the focus of this paper. Characteristics of the discovery interface that are consistent across all tools are a single search of the central index, a simple keyword search box, relevancy ranking, facet or refinement tools, and recommendations or spell check; additional features vary between products or libraries.⁵ Topics covered in this paper may address the interface (display), central index (indexing), and areas where they intersect. Browse searching and visible use of authority data are standard features of many OPACs that are not emphasized or available in every discovery tool,⁶ and these features are not discussed in this paper. However, the questions and search strategies provided may be used to evaluate OPACs to the extent that features overlap.

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When individual libraries or reviewers evaluate a discovery tool, they typically employ simple searches that replicate those of a generalized set of users. Vendors often demonstrate their own products with preselected searches guaranteed to produce attractive results. The practice of using simple searches will evaluate how the basic needs of a majority of users are met, and it will demonstrate how a discovery tool handles simple bibliographic records. This practice does not demonstrate how a discovery tool handles complex topic searches or known-item searches that may be required for specialized materials. The needs of users of specialized materials may not emerge unless a tool is subjected to stringent testing. A tool that provides the indexing, search, and display features that allows users to discover specialized materials will meet the basic needs of the specialist user while easily meeting and surpassing the needs of the general user.

Evaluation through a Music Lens

In this paper, music is used as an exemplar of specialized materials that require the more rigorous evaluation of a discovery tool. The description of how music data can be used for rigorous evaluation of a discovery tool will serve as a resource for catalogers (and others who are comfortable with MARC and cataloging terminology) who may not regularly catalog or search for music materials but are involved in selecting a discovery tool that includes records for music resources.

Bibliographic records for music materials are often complex. The underlying challenges of music description include the existence of multiple manifestations and expressions of a single work and the related need to collocate works and expressions.⁷ Multiple works, expressions, creators, and contributors may be represented in a single resource, making relationships difficult to reflect clearly in a single record. Additional challenges include describing form, genre, and medium, accounting for a multilingual publishing environment, and providing identification of various formats of materials. Users of music materials may seek materials for a specific instrument or by a particular performer, or they may require a precise “known-item” query.

The Music Library Association (MLA) has published a document detailing system-neutral search, indexing, and display requirements for the discovery of music resources.⁸ Organized loosely around the Functional Requirements for Bibliographic Records (FRBR), “Music Discovery Requirements” includes discussions of individual attributes of musical works, expressions, and manifestations, accompanied by an explanation of the importance of being able to effectively search for and view this information for the discovery needs of music users. The intended readership is broad; it targets “those creating or guiding the development of discovery

interfaces that will include music materials.”⁹ The document’s indexing and display recommendations can be used to create or adapt a discovery tool; however, it does not provide recommendations or examples of how one might evaluate an existing product.

This paper provides readers with a practical method to evaluate individual discovery tools. Theoretical issues related to the description of music materials or reasons why certain features of a discovery tool are critical for music are not addressed in this paper. For additional explanations of the relationships between user needs and discovery tools, readers are urged to consult the corresponding sections of the MLA document.

MARC Records: Evaluating a System from the Inside Out

MARC records will remain in libraries’ databases for the near future, even as the Library of Congress’s Bibliographic Framework Transition Initiative (BIBFRAME) is under development.¹⁰ Discovery tools can include records created with multiple metadata encoding schemes, including Dublin Core (DC) records from digital collections or Encoded Archival Description (EAD) finding aids. Even though MARC records are a subset of records searched by a discovery tool, their examination is critical. A discovery tool’s degree of smaller-scale functionality—display, indexing, simple hyperlinking—for MARC records can be indicative of its ability to realize larger-scale functionality such as features that maximize FRBR capabilities, utilize authority data, or incorporate nonlibrary data. A product’s treatment of its fullest and most complex MARC records will illustrate its capacity to harness fully the powerful capabilities of bibliographic data. An investigation based on MARC data will help answer this question: Is a discovery tool realizing its full potential?

Fully evaluating how well discovery tools utilize bibliographic data to power searches and represent resources requires familiarity with the MARC structure and records that generate public displays. By default or design, not all areas of bibliographic records display in every system, search terms might not display in results, and contents of fields and subfields may be suppressed or rearranged. For these reasons, records retrieved in public interfaces must be compared against MARC records. Comparison methods depend on the discovery tool and its configuration. In some public interfaces, a labeled MARC record can be viewed by selecting a “staff” or “librarian” link. Other interfaces may not offer a publicly viewable MARC record, and it may be necessary to view the same record in the staff module of the integrated library system (ILS), or, in the case of OCLC’s public WorldCat interfaces, in Connexion or

another OCLC subscription product. The comparison of the public display against its corresponding MARC record allows for a thorough investigation using bibliographic data and ensures that it is the discovery tool that is being evaluated, not the bibliographic data itself. Direct exploration of MARC records is ideally accompanied by access to system information including indexing tables and display rules. The method described in this paper can compensate if system information is unavailable, or it can be part of a multifaceted assessment.

Checklists and Evaluation Cycles

A flexible checklist can be used to evaluate and customize a discovery tool throughout its life cycle. Depending on its users and vendors, each library will need to develop a checklist that best meets its needs. Before implementation, a checklist can be used during the request for proposals and selection processes. A checklist allows a library to compare vendors' versions of discovery tools and the most current versions of multiple tools as implemented at various institutions. Following selection, a checklist can be used to request enhancements and customizations from vendors or in-house programmers; libraries that are beta testers or development partners can also use a checklist to shape a new system. A library can use a checklist for periodic reevaluation of a system to see if it still works as desired. When enhancement options are exhausted or the system no longer meets a library's needs, a checklist can be used to begin a new selection process.

A good checklist is flexible and may be customized locally. Checklist items that involve bibliographic records will need revision as cataloging practices change and evolve. Discovery tool features can change frequently based on emerging needs, and products may enter or leave the market. Users' and libraries' expectations of functionality and design change over time. Libraries should adjust discovery tool requirements and evaluation measures based on their own unique collections and user needs.

Potential Effect of RDA and Changing Standards

The ongoing relationship between the implementation of Resource Description and Access (RDA) and discovery tools is difficult to predict. MARC format has been changed to accommodate RDA. In most cases, new fields and subfields have been defined; in a few cases, fields or subfields will become obsolete. As RDA records are added to a database, modifications will be required to add or adjust display and indexing for records to continue to reflect the same type

of information (i.e., a newly defined MARC field replaces a newly obsolete field for recording identical content). The continued use of MARC with RDA means that RDA's emphasis on relationships and linkages may be difficult to express in current discovery tools.

Changed rules for constructing access points mean that without retrospective conversion of Anglo-American Cataloguing Rules, 2nd edition (AACR2) access points in bibliographic records to RDA, different access points for the same entity may coexist in the database, linked only by a "see" reference in the RDA authority record. This illustrates the importance of authority records, currently underutilized by discovery tools. In an RDA environment, the use of authorized access points are essential to reflecting FRBR relationships, and bibliographic records no longer have restrictions on added access points as under AACR2 (e.g., no restrictions on the number of collaborators represented in access points). Use of controlled access points for works and expressions and the creation of authority records are long-established practices in music cataloging, meaning that existing records for music resources provide a rich source of test material.

In addition to the implementation of RDA, records for music materials will be affected by the implementation of the Library of Congress (LC) Genre/Form Terms for Library and Archival Materials (LCGFT) and the Library of Congress Medium of Performance Thesaurus (LCMPT) for music. These thesauri will replace the use of LC Subject Headings (LCSH) to provide access to form, genre, and medium for musical works.¹¹ The LCMPT required the definition of new MARC fields, and indexing and display rules in end-user and back-end tools may need to be changed to accommodate the MARC format change. As with all MARC changes, libraries may make individual decisions regarding implementation and timetables in their ILS or discovery tool; as with previous headings changes and LCGFT implementations, libraries may retain older headings in existing records.

Literature Review

The literature relevant to the selection and evaluation of discovery tools includes usability studies, case studies, reviews, and evaluative checklists. Beginning with the earliest days of ILSs and OPACs, librarians have used their familiarity with data capabilities and users' needs to develop checklists for selection, evaluation, and improvement of library discovery interfaces. In describing evaluation of OPACs in the 1980s, O'Rourke advocates for the checklist approach. One advantage is that "by systematically examining catalog characteristics, a library comes to define its own catalog requirements more accurately and adequately."¹² Luong and Liew share

the process and checklist used to evaluate traditional OPACs in academic libraries in New Zealand. They offer tables with detailed search and display criteria that staff used to evaluate multiple products. Many of these criteria are of high importance to the discovery of items with complicated bibliographic descriptions: the use of cross-references, authority control, and logical display of fields within bibliographic records.¹³

Today, with the emergence and development of web-scale discovery tools, checklists continue to be a powerful evaluative tool. Vaughan describes the process of involving library staff in selecting a web-scale discovery service at the University of Nevada Las Vegas Libraries. The process included a “staff survey” related to multiple aspects of web-scale services; the questions on the end user interface are appropriate for discovery tools of any kind.¹⁴ Ramsay and Chamberlain offer a broad list of selection considerations emphasizing open-source tools in their “Software Selection Methodology for Library Discovery Layer Systems.”¹⁵

Specific products have been studied and compared in the course of selection and implementation at individual libraries or consortia, and as stand-alone discovery tools not tied to any particular library. Yang and Wagner compared seventeen discovery tools against a checklist of features that characterize next-generation catalogs and discovery tools. Although features can change rapidly as products evolve, features on their checklist remain standard in discovery tools.¹⁶ The literature includes numerous case studies that describe the implementation of discovery tools at individual libraries, many of which include details of the selection process as well as discussions of the tools considered. Individual discovery tools reviewed or evaluated in the context of music discovery include Summon, WorldCat Local, and Primo.¹⁷

Usability testing has been conducted in a number of libraries (primarily academic). Fagan’s literature review of usability studies describes the study and results at each university library represented, followed by recommendations for the method for future studies. Fagan emphasizes that study results are affected by the scope and size of individual collections.¹⁸ Studies focusing on music users have also been conducted. Music faculty and graduate students were the subjects of a usability study of the next-generation catalog AquaBrowser (Serials Solutions) in use at the University of Chicago,¹⁹ and usability testing of OCLC’s new user experience for FirstSearch with music graduate students is planned at the University of Washington.²⁰ Transaction logs provide another source of evaluation, using large-scale data to analyze searches and features used. Search-log studies include a comparison of use of the classic OPAC and the discovery tool Encore (Innovative Interfaces) at New York Law School reported by Ballard, and Meadow and Meadow’s study of the transaction logs from Summon at Montana State University.²¹

Method

The strategy here offers concrete methods for analyzing a discovery tool’s use of the data contained in existing bibliographic records for music material. Selected specific elements of MARC records that are particularly important to utilize for users to discover and select music materials are discussed. Search strategies are included, often with suggested search strings. Searches are intended to work in a general keyword index (the default simple-search-box option standard in discovery tools), with limits (pre-search), facets (post-search), or other indexes indicated as appropriate. If searches are replicated in a web-scale discovery tool that includes data from multiple sources, limiting searches or results to bibliographic (“catalog” or “library”) records will focus examination on MARC records. Search strings are enclosed in curly brackets {like this} to avoid confusion as to whether quotation marks are part of the search. Searches containing multiple terms are assumed to be joined as a Boolean AND search. Comparison of the public and MARC records may be necessary to determine why results were retrieved in a search, what controlled title access points are present, and how titles are recorded and encoded.

Appendix A can be used or adapted as a checklist. It contains questions related to record elements and system functionality, including both general features and music-specific ones. Appendix B contains specific recommended searches, sample access points in MARC format, or titles with OCLC numbers and relevant fields from bibliographic records. Appendix B is meant for in-depth analysis of a system’s handling of music materials. Examples are exclusively music-based, though many elements of headings or records are shared by other materials. They may also be used without interpretation as MARC examples for programmers; the only additional step necessary would be to confirm that authorized access points match the LC authority file.²²

Beginning the Evaluation

General Features

A thorough direct exploration of discovery tools begins with a consideration of features related to the system as a whole. This will place scrutiny of individual bibliographic records in context. Features that merit consideration include search options, facets, treatment of physical formats, the linking of controlled fields, available indexes, and display of the content of records and encoded information. Within these categories, certain features are of particular importance for music. Ideal functionality will also provide a direct benefit for nonmusical materials.

End users begin searching and refining results through

basic and advanced search options, post-search facets, and lists of results. Familiarity with these features enriches understanding of the end-user experience. After examining search options, a large set of search results will enable investigation of additional characteristics of the discovery tool. To retrieve a large set of results, a blank search (without search terms) is ideal. Broad searches such as {history}, {Bach}, or {music} are also effective. A spot-check of individual results will give a general picture of layout, labels, navigation, facets, item details, and any other features of interest.

Specific Fields and Elements for Investigation

Records for music materials can include format information, multiple languages, genre/form and subject challenges, and the representation of multiple creators, contributors, works, and expressions. Bibliographic information in the following areas is discussed:

- creator and contributor names
- titles of works and expressions
- analytic entries
- relationships
- subject subdivisions and facets
- genre/form
- medium of performance
- physical description
- format options
- languages
- notes (language/notation, performer/cast, production, recording, contents)
- edition information
- numbers (publisher, music, or plate)
- diacritics, special characters, and stopwords

Each area is addressed, including general search and evaluation strategies. Specific questions for use in a checklist and detailed searches and examples are provided in the appendixes.

Authorized Access Points and Display of Creator and Contributor Names

The need to accurately represent creators and contributors in a discovery tool is universal across subjects and formats. Challenges related to display and linking functionality are compounded in music records, where it is common for more than one creator or contributor to be associated with a resource. Records for scores may contain added access points for an editor of the music, who provides a substantial intellectual contribution, or for collaborators (such as librettists) for dramatic works. Records for music sound recordings present more complex challenges. For a single classical

work, there will be an access point for the performer in addition to one for the musical work. In compilations, there may be multiple works by different composers, and different performers for each work. In all cases, the forms of names in access points do not necessarily match those in statements of responsibility or notes fields.

Post-search facets, lists of results that display following a search (henceforth referred to as “brief results”), displays of single records, and linking functionality on controlled access points are areas where a discovery tool’s treatment of name access points requires evaluation. The display of names in brief results and individual records has proved problematic in discovery tools. Default settings and customizations vary widely with products and instances. Faceted tools may not automatically include all traced creators or contributors under an author facet.

To determine whether or how corporate names appear under an author facet, one may conduct an author index search for all or part of an authorized access point for a prolific or locally represented musical group. If there is no author index option, one may substitute a general keyword search for the name limited to a sound or video recording format or with a format-related search term such as “disc.” In all-field keyword searches, a phrase search may be required in cases where individual elements of a name are likely to appear separately (“Chicago Symphony”) to exclude results with “Chicago” in a location note and “symphony” somewhere else). Corporate names where a group is identified as a subordinate unit may be misrepresented in a facet. Only the parent body might display: “Bayerischer Rundfunk” versus “Bayerischer Rundfunk Orchester” (1102# \$a Bayerischer Rundfunk. \$b Orchester).

A list of brief results for records with multiple name access points will indicate where information from name access points is visible and how it is labeled. A brief results list can be retrieved with a simple search for a musical form, performer, or composer. In individual records, one should check the following: where names or portions of names from access points appear, whether they appear in separate locations within a record, how they are labeled, how they are grouped, and whether authorized name access points replace the statement of responsibility in MARC field 245 \$c. Searches with elements of the authorized form of a name used as keywords will test indexing as well as display. The display of names where authorized access points are entered in direct order (a form other than “last name, first name”) should also be investigated.

All controlled access points serving as hyperlinks should function as intended. For names, this means referring to the correct individual or body. The challenge of precision can be most acute with common names (such as John Adams) or names based on given names (such as Hildegard of Bingen), where additional name access point elements beyond

the information recorded in \$a of name headings (dates, numeration, etc.) are needed to identify or link to the correct entity. Links should be tested both in facets and within records because some discovery tools generate different searches depending on what screen a user views.

Titles of Works or Expressions

The importance of consistent, controlled access points or identifiers for musical works cannot be overstated. They are essential for the indexing and collocation of musical works and expressions, even if end users do not use them as search terms or see them. Discovery tools vary widely in how these titles are displayed or utilized for linking or collocation. Some may completely suppress these fields by default, while others may provide partial or full display or linking.

The titles illustrated in this paper are the standard form used to consistently identify, differentiate, and collocate musical works and expressions. The term *preferred title* is used to reflect RDA terminology and is the successor to AACR2's *uniform title*. In MARC bibliographic records, these titles are those found in access points in fields 130, 240, 730, and title subfields (\$t with additions) in 700, 710, or 711. Functionality related to preferred titles includes indexing (title, keyword, or other), visibility in a record, fullness and accuracy of display, association with appropriate names, and any linking or collocation feature. Because treatment of preferred titles is so fundamental to determining the adequacy of a discovery tool for music, these titles are discussed in greater detail than are the remaining sections.

For preferred titles to function as unique identifiers for works and expressions, all elements within the title are important to ensure accurate identification and differentiation. For preferred title search strings to link precisely to a work or expression, every subfield, in order, is needed. If full titles are displayed to users, subfields should display in their proper order. Displayed titles for works that have creators (composers) integral to access points (titles in fields 240, 700, 710, and 711) must be associated with those names to be meaningful to users, and titles must be bound to those names to provide linking functionality based on works and expressions.

Music cataloging divides preferred titles into two categories: generic (a type of composition, such as “symphony”) and distinctive (those that are not generic). A typical configuration of a distinctive title in a name-title access point is in the format “Mozart, Wolfgang Amadeus, \$d 1756–1791. \$t Zauberflöte.” To execute searches for distinctively titled works where the authorized form of the title and a transcribed or translated title are likely to differ, one may begin with the authorized form or a transcribed form. Searching by the authorized form—e.g., {Zauberflöte}—permits simultaneous evaluation of display and indexing, but

requires knowledge of the authorized term. Searching by a transcribed or common English-language form—{Magic Flute}—requires careful scrutiny of the displayed record for the authorized form. Records for works with generic titles will be retrieved with keyword searches for the composer's name plus known elements of the preferred title (i.e., form, medium, or opus number). In some cases, they can be retrieved with searches for the composer's name plus the work's commonly known name.

Titles in authorized access points for musical works may include additional elements for differentiation to indicate expression-level characteristics or to indicate whole-part relationships. A single access point can contain elements and subfields representing all of these categories. Subfields following \$a (240, most commonly) or \$t (7xx) indicate medium (\$m), work or serial number (\$n), and key (\$r), with a typical configuration in the form “Beethoven, Ludwig van, \$d 1770–1827. \$t Sonatas, \$m violin, piano, \$n no. 5, op. 24, \$r F major.” Preferred titles can also indicate whole-part relationships. Parts may be numbered (\$n) or named (\$p), and these subfields can be repeated to indicate named or numbered parts of parts. Additional complex configurations are possible. Expression-level characteristics that may be appended to preferred titles of works include language (\$l), version (\$s), and arrangement (\$o). The use of “selections” (\$k) is commonly used to indicate excerpts of a single work or selected works in a composer's body of works.

When examining linking functionality of title access points with multiple subfields, it is necessary to explore what degree of linking a discovery tool offers. Some discovery tools may not provide links on title access points. Some generate links from the first subfield only (\$a in 130/240/730 or \$t in 700/710/711), while others generate bound links on the entire title-access-point string to the exact expression represented. Associated names may not be linked to titles by default, or only the names may be links.

The display, linking, and indexing of access points for preferred titles constructed without names should also be explored. Records for most motion picture soundtracks include an added access point for the preferred title for the film. A keyword search limited or narrowed to sound recordings for {motion picture music [film title]} should lead to records with the film title as an added access point in the MARC 730 field. Access points for musical works without names are less common.

Analytic Entries

Bibliographic records for sound recordings containing musical works (Western art music) by multiple composers or works of different types by a single composer typically contain analytic access points, which are access points for a work or expression contained completely in the resource

described. Records with analytic authorized title access points are relatively easy to find, e.g., compact discs with works by more than one composer. Searches that are most likely to locate records with analytic entries include those for multiple composers' names, one composer with two named or nicknamed works (Mozart's "Haffner" and "Jupiter" symphonies), or titles frequently issued together (the operas *Cavalleria* and *Pagliacci*). A "sound recording" limit or facet creates a more manageable set of results, particularly with general keyword index searches.

Relationships

The role of a person or corporate body is important for the identification and selection of music materials. This is particularly important for sound recordings, where composers and performers may be of equal importance to users, or where it needs to be clear that a single person is both the composer and performer. Roles can be indicated in notes, or can follow name access points in MARC relator codes (\$4), optional in AACR2 records, or in relationship designators (\$e) defined in RDA. Testing the use of codes is still necessary if codes in \$4 remain unconverted to terms in \$e. A decision about display of codes and terms may depend on how many records in a library's database contain the codes and whether new records include codes or terms. If codes or terms have not been applied consistently, display and indexing in discovery tools will not accurately represent relationships potentially described in those subfields for all records.

The representation of work-to-work relationships as defined in FRBR and RDA are common with dramatic musical works (operas based on existing plays) and vocal works (preexisting texts or poems later set to music). Preferred titles of related works are typically included in bibliographic records for the newer work. Access points in AACR2 records cannot indicate the precise nature of the relationship, meaning the information is provided in a cataloger-supplied note. In RDA records, work-to-work relationships are indicated by preceding an access point with relationship information in \$i in a MARC 7xx field. The access point "7001# \$i Based on (work): \$a Shakespeare, William, \$d 1564–1616. \$t Romeo and Juliet" would be present in records for the various inspired works by Bellini, Berlioz, Gounod, Lavrovskii, Prokofiev, Rota, Tchaikovsky, and Zeffirelli. To confirm that contents of \$i are not in author or title indexes, one would search for the relationship term in each index, avoiding terms that are identical to words used in name authorized access points, particularly in \$c (e.g., instrumentalist). If \$i in MARC 7xx name or title fields is in these indexes, there will be results from title or author index keyword searches for {based work} or {"based on work"}. Similar searches with {contains work} or {contains expression} will address the use of \$i in analytic titles in the MARC 7xx field.

Subject Subdivisions and Facets

Current LCSH for notated or recorded music frequently employ form (\$v) subdivisions ("Scores and parts") or chronological (\$y) subdivisions ("1991–2000"). Faceted discovery tools offer different default and customized arrangement and indexing of subject headings in facets. Topical subdivisions in a single subject heading may be separated within a subject facet, distributed among different facets, or suppressed from view. Topical headings and subdivisions typically appear under "subject" or "topic." Form, chronological, and geographic subdivisions may appear in other facets such as "genre" or "era," based on subfield coding, or they may be completely omitted from facets. Form subdivisions for notated music in LCSH and representation of notated music coded in the MARC LDR, 00x, or 336 fields can closely correlate ("Scores") or be more precise ("Scores and parts").²³ Because of this overlap, "Scores" may appear twice in facets, such as format and subject or format and genre. When investigating facets, apparent duplicates may be the result of separate coding or fields generating each term.

Preferred titles are rarely, if ever, included by default in subject facets. To investigate, one would search by the authorized form of title for works or groups of works by a composer likely to be the topic of book-length analysis, such as Wagner's *Ring* opera cycle, or by keywords that include a composer's name and subdivision terms such as {analysis appreciation} that imply topical treatment of a work. Distinctive titles are preferable for these searches. In some cases the initial element of a preferred title ("Requiems, D minor") may be identical to the topical term ("Requiems"), making it difficult to differentiate subject keyword indexing of topical subjects from preferred titles as subjects. Linking functionality of subjects that are work titles requires similar evaluation to that for title access points coded as titles, e.g., titles in a MARC 700 field.

Genre/Form

The dedicated genre/form MARC field (655) is currently used in records for music resources such as music-related films or radio programs because LCGFT has already been implemented for moving images and radio. Most genre/form information in records for music scores and recordings is represented in subject headings in the MARC 650 field, Subject Added Entry. Following implementation of the LCGFT for music, genre/form information for music will be recorded in the MARC 655 field, Index Term—Genre/Form. Libraries and vendors may have addressed treatment of genre headings in discovery tools in response to the implementation of other LCGFT projects, such as moving images. Faceted interfaces may also treat form subdivisions in subject headings (\$v) as genres.

Since genre headings are already in use, it is easy to evaluate their indexing, display, facets, and linking functionality in a database that contains those headings. Recently cataloged video recordings are likely to include genre headings, and some libraries may have made retroactive changes to older records. A known-title search will reveal if headings appear under a genre facet and how headings display and function in individual records. A search for a genre term that is not also used in LCSH, such as {"classical music radio programs"}, will help in evaluating indexing and facets. Some genre/form terms contain elements that overlap with LCSH topical headings ("opera films"). Terms with identical forms in both LCGFT and LCSH ("field recordings") may be useful as searches to determine whether the term appears more than once under a single facet or under multiple facets.

Medium of Performance

Medium of performance is currently recorded in controlled form in subject headings or in codes in an optional MARC 048 field, used only for music materials. RDA records may also record medium in the MARC 382 field, Medium of Performance. Following the implementation of the LCGFT and LCMPT, the medium of performance terms currently part of LCSH and recorded in the MARC 650 field will be recorded in the MARC 382 field in recognition that they are not genre/form or subject terms.²⁴ The eventual widespread use of the 382 field means that a medium index may be possible in discovery tools. Testing the treatment of the 382 field will require a critical mass of records that contain the field. The LCMPT has not yet been implemented.

Physical Description Statements

Because music materials may be issued in multiple pieces or formats, physical description statements (MARC 300) may be more complex than for books. Discovery tools differ in display of subfields, particularly those following the first occurrence of \$a. Scores and parts issued together are all of primary importance and are described with separate terms in subfield \$a; parts are not considered or coded as accompanying material in \$e. In some cases, primary materials may be of different dimensions, so the field becomes more complex, with subfields for extent (\$a) and dimensions (\$c) repeated.²⁵ Display in a public interface is likely of more use than indexing, since format facets/limits or subject subdivisions permit users to select format. To locate records to evaluate display of complex 300 fields it may be necessary to perform intermediate searches using a staff utility such as a cataloging module within an ILS if the field is indexed, or OCLC Connexion, which offers an index that searches extent (300 \$a). Alternatively, one may search for known items.

Media that accompanies print formats may be indicated in a repeated MARC 300 field in RDA records or in subfield \$e (accompanying material) in a 300 field in RDA or AACR2 records, and music catalogers will likely continue to use \$e for recordings accompanying books or scores.²⁶ The Hal Leonard Play-Along and Jamey Aebersold Jazz series are issued as lead sheets (notated music) with accompanying CDs. These are usually cataloged on a single record with the score as the primary format (300 \$a \$b \$c) and the CD as accompanying material (300 \$e). These series and other score and CD sets usually contain series titles, subject headings, or notes that can be combined to identify records. Most music titles with an additional format indicated in \$e will also include appropriate added 006 and 007 fields that can be used for limits, facets, icons, or labels.

Format Options

Format is a general term that does not correspond exactly to RDA content, carrier, or media types. Specific format terms used in discovery tools may combine characteristics of content, carrier, and media. Different products and different libraries' implementations of the same discovery tool may employ different terms and definitions. MARC leader (LDR) codes, at times combined with codes in fields 006 and 007, allow mapping to many precise formats that can be used in limits, facets, labels, or icons. Identifiable formats, which may be labeled with various terms, include book, cassette tape, compact disc, DVD, LP, manuscript, music recording, score, sound recording, spoken word recording, and video recording. MARC coding is sufficiently precise to identify additional formats, including 78 rpm discs, negative disc stampers, or wax cylinders, that could be of interest for specialized collections.²⁷ Libraries may wish to customize format options and labels to best reflect their collections and meet users' needs.

Format facets and icons may be explored with a blank or broad search. Searching a known item and reviewing resulting icons, labels, or facets can also indicate completeness and accuracy of indexing. Considerations include the following: Does a limit or facet selection of a format lead to results that include all properly coded records for that format? Are additional formats included that are not implied by the term? With scores, incomplete results can occur with the format option "manuscript," which is often mapped only to text (LDR/06 "t"), even though a code is available to indicate manuscript music (LDR/06 "d"). To determine whether music is included in the "manuscript" format, one may search for a known music manuscript and look for results with "manuscript" as a format facet option, label, or icon. A subject or keyword search for {manuscript} or {manuscripts} will not be accurate because "manuscripts" is used in subject headings, and "manuscript" is a common

keyword. In other cases, formats retrieved may be broader than a term implies. A discovery tool may offer “moving image” as a format option, but items like slides or filmstrips may also be included if a broader mapping is used (LDR/06 “g” Projected Medium). Testing for instances like this can be difficult, and may best be accomplished with a search for a known item.

For those records where multiple formats are reflected in a single record, searches and examples similar to those for physical description/accompanying materials will also test facets or icons, provided the associated MARC 006 (additional material characteristics) or 007 (physical description) fixed fields are present in bibliographic records. A search for a known title issued with accompanying material of a different format will indicate if added formats are offered in facet options or represented with icons or labels in brief results or individual records. For the same title, a pre-search limit for the accompanying format will indicate whether that format is indexed. Searches for the customary AACR2 note phrase {“accompanying compact disc”} should indicate the relative numbers of print materials and recordings under a format facet.

Content, media, and carrier (MARC fields 336–338) will be present in all RDA records. Assuming a library retains these fields in its local catalog, any RDA record can be used to evaluate display. Terms in the vocabularies for each are not necessarily unique to those fields, so known-item searches may be best to use to determining indexing. The number of records containing the MARC 344–347 fields (sound, moving image, video, and digital file characteristics) should increase as RDA is gradually adopted. One may use terms in the relevant RDA instructions in chapters 3.16–3.19 as search terms to retrieve records to evaluate display and explore indexing. If indexing of these fields in a discovery tool has not yet been defined, terms in these fields are indexed as entity attributes in OCLC Connexion and FirstSearch and as general keywords in the freely available WorldCat.org.²⁸

Language Limits, Facet, or Labels

Bibliographic records for instrumental music contain the MARC language code for “no linguistic content” (“zxx”); this code is also used for models, realia, and other items that do not provide language characteristics. Limits, displays, and language facet options vary among discovery tools. Terms generated from “zxx” (“music,” “no language,” or “no linguistic content”) might be offered as language choices in an advanced search. A search for orchestral music or symphonies narrowed to scores should allow sufficient expansion of a language facet to determine whether a term representing code “zxx” appears, or a record for an instrumental work can be examined to determine whether a term is included. The

code is only used if all works in a compilation lack linguistic content, so a limit to scores increases the likelihood of retrieving instrumental-only works.

For items with multiple primary languages, there is no coding distinction between a single work in multiple languages and a compilation of works each in different languages. Records likely to contain codes for multiple primary languages (041 \$a or \$d) include compilation sound recordings of vocal works, particularly if they are compiled based on performer rather than composer, and score anthologies of arias or art songs. When testing items with multiple languages coded in the same subfield, the MARC record should be checked for current practice, which uses the granular subfield coding that some systems require to identify languages (041 \$a eng \$a fre \$a ger instead of the older \$a engfreger).

If searching for translations of musical material, vocal scores of operas with parallel texts are among the most common instances of musical materials with both the original language and a translation. Uniform titles in AACR2 may employ “polyglot” to indicate three or more languages, representing at least two translations, making the search {polyglot scores} useful until the term—obsolete in RDA—is no longer represented in a sufficient number of catalog records for an effective search. Subtitles in the language sung and translations are standard in opera DVDs. A video recording or “visual material” search for {operas subtitles} or {filmed operas subtitles} should be sufficient to yield results that indicate how subtitles are treated.

For the purposes of coding language content, even written material included in a music resource may be considered “accompanying material.” Scores frequently contain editor’s introductions or written performance instructions, but only the language of vocal text within the notated music itself is considered “primary.” Searches for sound recordings (limit/facet) are likely to locate records containing codes for accompanying materials in one or more languages. Many commercially issued sound recordings are issued with program notes that include multiple translations or with printed vocal texts and translations. A search designed to retrieve records for instrumental music (without linguistic content) that retrieves numerous records labeled as being in a language such as English indicates that accompanying materials are indexed as a language. Records for scores often refer to “critical commentary” or a “critical report,” and some series are issued with extensive introductory material or editorial notes. Searches such as {critical commentary scores} should retrieve records for scores with significant accompanying material.

Notes

Notes relevant to music materials include those for language or notation, recording information, production credits, performers, and contents; general notes also contain important

information. Most notes contain information needed for users to identify or select a resource, and any suppression of notes fields should be a deliberate choice.

Language or Notation Note

AACR2 records for music resources frequently include a dedicated language note (MARC 546) indicating language of sung or spoken text for vocal works. RDA records for scores also indicate musical notation in this field (546 \$b, Information Code or Alphabet). The increased use of this subfield in music cataloging means indexing and display must be tested even if language notes have been displayed and indexed satisfactorily in the past. Records for scores of vocal works will include both subfields \$a and \$b in one or more 546 notes. Records for notated instrumental music may include \$b only. Keyword searches for {"staff notation"} or {"graphic notation"} may not test indexing of this subfield because these phrases are routinely recorded in general (500) notes in AACR2 records. Currently, field 546 cannot be searched in any of the WorldCat indexes as an intermediate step to identify records.²⁹ It may be easiest to identify RDA records for notated instrumental music, then search based on known data in the record.

Performer and Cast Information Note

Performer and cast information is recorded in a dedicated note (MARC 511). Although performer and cast names can appear elsewhere in a record, this may be the only place where performers are associated with particular dramatic roles or instruments. It may also be the single place where their names match conventional usage. Determining whether the note displays and if the label differs for each indicator (5110#, No Display Constant Generated, customarily used with music sound recordings, or 5111#, Cast, customarily used with general feature films) can easily be accomplished by comparing records for feature films and musical sound recordings.

Testing inclusion of the MARC 511 field in an author keyword index through searches requires identifying records where the form of a name transcribed in the 511 field does not appear in any other potential "author" fields (1xx, 245 \$c, 505, 508, 7xx, 8xx). This may occur most frequently where the form of a performing group's name is in English (e.g., "Vienna Philharmonic") in the note but in another language ("Wiener Philharmoniker") in the authorized access point. An alternate search method is to include non-name information from a 511 note in an author-index search, avoiding terms that may be present in other "author" fields within the same record.

Production Credits Note

Creation and production credits for creators and contributors other than performers or cast are recorded in a dedicated note (MARC 508). This is routinely used in records for video recordings, where it can contain names of creators or contributors related to music including conductors and composers. Using searches to test whether information in this note is contained in an author index is problematic because the names may also be represented in access points. It may be possible to search for roles in an author keyword index: {producer director choreographer}. However, as relator terms appear more frequently with name access points in RDA records, it will be difficult to use a search to distinguish between indexed subfields \$e in name headings and indexing of field 508.

Recording Information Note

Recording information for music sound and video recordings is provided in a dedicated note, MARC 518 field, Date/Time and Place of an Event. In addition to date and place information, this note may also indicate whether the recording was live, the names of specific venues, or distinctions of place or date by work in a compilation. Notes in AACR2 records utilize a single subfield (\$a) with easily readable contents. More granular subfields with RDA mean that subfield-specific labels may be required to make the note easy for a user to interpret. These notes lack subfield \$a and record date, place, and other information in subfields \$d, \$p, and \$o, respectively; the field may be repeated with distinction by work in subfield \$3. Because use of these subfields is new, a review of display, labeling, and indexing of the field and subfields may be desirable even if the field was indexed and displayed according to a library's preference in the past. To test indexing of the MARC 518 subfields \$d, \$p, and \$o through a search, content in any of these subfields that is not present elsewhere in a retrieved record can be entered as a search together with composer or performer name.

Contents Note

Formatted contents notes (MARC 505) contain useful, detailed, and eye-readable information about titles, composers, performers, and other contributors. Analytic access points are not typically used for song titles in records for popular music materials. Cataloging rules or practicality may preclude comprehensive analytic added access points (7xx) for musical works in compilations. Furthermore, the contents note may be the sole field where the title in the bibliographic record matches the title on the item.

To test author or title indexing of this note, it is necessary to identify records with contents notes that contain

contributor and title information not present in fields potentially indexed as author or title (1xx, 24x, 508,511,7xx, 8xx). These tend to be compilations or anthologies with a large number of works or recordings of popular music. When items are identified, a search in an author keyword index for data present only in \$r (enhanced) or \$a (non-enhanced) and a name from a 100 or 700 field will indicate if information in \$r is an author index. To determine whether \$t is in a title index, the same process can be repeated with a title from \$t and terms from the title proper (245 \$a).

Edition Information

Edition information for music materials recorded in the MARC 250 field, Edition Statement, may provide significant information, including the editor of the music or transcribed information about vocal range. In RDA, edition information recorded in this field also includes details related to arrangement, currently recorded in the statement of responsibility (245 \$c), or related to score format, previously recorded in the 254 field, Musical Presentation Statement, obsolete in RDA.³⁰ Both fields will coexist in a database that contains AACR2 and RDA records.

The potential redundancy of terms in the MARC 250 and 254 fields with information elsewhere in a record makes it difficult to use a search to differentiate types of indexing. Some discovery tools may not index the musical presentation statement, making searching within this field impossible. Currently, the 254 field cannot be searched in any of the WorldCat indexes.³¹ Display may best be evaluated using records known to contain these fields.

Publisher, Music, or Plate Numbers

Music materials typically lack ISBNs, and may include publisher, issue, or plate numbers. Publishers' numbers for scores and issue numbers for recordings are used similarly to ISBNs for ordering, searching, and identification. They are recorded in the MARC 028 field, Publisher Number. Discovery tools offer different capabilities related to the indexing of numbers in 028 \$a and the indexing of the publisher in 028 \$b. Bibliographic records for recordings and publications by jazz label Mosaic Records and classical score reprint publisher Recital Publications frequently include multiple occurrences of the 028 field, recording both original and reissue or reprint information in subfields \$a and \$b. Determining indexing of numbers in the 028 field requires a publisher number index and a known item; CD box sets are typically suitable. The display of subfield \$q, Qualifying Information, defined in 2012, may be evaluated by identifying newer records for music resources, particularly CD boxed sets, that contain the subfield.

Diacritics, Special Characters, and Stopwords

Musical sharps and flats are essential to the musical key element in preferred titles and may be present in transcribed titles.³² Diacritics are common in records for music materials, which frequently include works, imprints, and access points in languages other than English. How all of these are searched and displayed is important. There are abundant instances of access points that contain sharps, flats, and diacritics. Searching using the flat (♭) and sharp (♯) symbols may require copying the symbols from another source. It is possible that the pound sign (#) functions as a sharp sign, but it should be noted that some discovery tools use the symbol (#) as a wildcard character.³³ Search capability can be explored with pairs or sets of searches using the correct symbol, the equivalent word, and (for sharps) the pound sign. Czech, German, and Russian names and titles frequently include many diacritics; special characters (i.e., degree signs and superscripts) are not common in music records but can appear in titles of contemporary works. Evaluation using known items may be the most effective strategy in such cases.

RDA introduces a new display concern for sound recordings. Instructions on recording copyright dates require a phonogram date to be preceded by the phonogram symbol (©) if it can be reproduced when the data are recorded.³⁴ This is a change from AACR2 practice where the symbol was recorded as "p." The phonogram or copyright symbols may display incorrectly when a system is unable to accommodate them. The phonogram symbol is common in sound recording records, and display can be determined by retrieving an RDA record that contains the symbol.

Usually a stopword, "a" is meaningful when part of musical key. Without a way to force "a" into a phrase search, users searching for a musical form plus {"A major"} (intending the musical key A major) will retrieve other terms with "major," leading to erroneously broad results for musical works (musical keys C major, D major, A major, etc.). Another common element of transcribed and preferred titles that needs to be searched as a meaningful term is "no." (abbreviation for number), which may function as a Boolean operator in some tools. Testing of phrases versus stopwords or operators requires only a search for the same terms with and without quotes, followed by a comparison of the number of results.

Conclusion

The scope of this paper is narrow within the world of discovery tools. Details such as the display of specific notes fields and indexing of publisher numbers from MARC records are critical for the discovery of music materials, but many more

resources are represented by AACR2 and RDA MARC bibliographic data. Thorough evaluation of discovery tools will require further steps. There are other types of resources that contain complex or specialized bibliographic description, such as rare books, serials, or archival collections, which can be used similarly to music for evaluating a discovery tool. With web-scale tools, it is essential to evaluate index, display, and linking for content in the entire central index, which encompasses more than AACR2 and RDA MARC records. Records created from sources within and outside library holdings with different descriptive and coding standards raise issues including metadata harmonization and de-duplication.

Looking ahead, discovery tools will develop new features and functionalities beyond those related to flat bibliographic records. The utilization of authority data and the relationships integral to FRBR and RDA have not been fully realized in discovery tools. The BIBFRAME model and linked data also offer opportunities for adding new functionality to discovery tools. As discovery tools and services emerge and develop new capabilities, and users' expectations demand continual improvement, the need for evaluation will only increase.

An awareness of the data being used and of the metadata schemes and descriptive rules in use, a checklist of questions, and a supply of examples and strategies together create a flexible and reusable evaluation method that is a valuable component of a comprehensive assessment of discovery tools. Catalogers and librarians who are aware of the capabilities of the data available to discovery tools must play an ongoing, integral role in ensuring that discovery tools go beyond meeting basic user needs and realize the full potential offered by the data itself.

References and Notes

1. Athena Hoepfner, "The Ins and Outs of Evaluating Web-Scale Discovery Services," *Computers in Libraries* 32, no. 3 (2012): 7.
2. Priscilla Caplan, "On Discovery Tools, OPACs and the Motion of Library Language," *Library Hi Tech* 30, no. 1 (2012): 108–15.
3. Geoffrey Little, "Thinking about Discovery Layers," *Journal of Academic Librarianship* 38, no. 6 (November 2012): 346.
4. VuFind (<http://vufind.org>) is in use at Villanova University (<http://library.villanova.edu>). Blacklight (<http://projectblacklight.org>) is in use at Stanford University (<http://searchworks.stanford.edu>) and has an optional music interface at the University of Virginia (<http://search.lib.virginia.edu/music>). BiblioCore (www.bibliocommons.com/products/bibliocore) is in use at the New York Public Library (<http://nypl.bibliocommons.com>). Summon (www.serialssolutions.com/en/services/summon) is in use at North Carolina State University (www.lib.ncsu.edu). An example of Primo (www.exlibrisgroup.com/category/PrimoOverview) is at Northwestern University (www.library.northwestern.edu). WorldCat Local (www.oclc.org/en-US/worldcat-local.html) is in use at the University of Maryland (www.lib.umd.edu). For additional information on the new FirstSearch that will eventually replace the current WorldCat Local and FirstSearch WorldCat interfaces, see "What to Expect in the New User Experience for FirstSearch," OCLC, accessed July 30, 2013, www.oclc.org/go/en/firstsearch-migration/expect.html.
5. Hoepfner, "Evaluating Web-Scale Discovery Services," 8. A slightly longer list is provided in Sharon Q. Yang and Kurt Wagner, "Evaluating and Comparing Discovery Tools: How Close Are We towards Next Generation Catalog?" *Library Hi Tech* 28, no. 4 (2010): 693–95.
6. The discovery tool VuFind offers a browse search and may be developed to make use of authority data; for a more detailed discussion, see Demian Katz, Ralph LeVan, and Ya'akov Ziso, "Using Authority Data in VuFind," *Code4Lib* 14 (July 2011), accessed July 30, 2013, <http://journal.code4lib.org/articles/5354>.
7. The existence of multiple manifestations per work is evident in a WorldCat search for a major work in the canon of Western art music. For an early, quantitative study confirming the widespread occurrence of multiple manifestations, see Richard P. Smiraglia, "Uniform Titles for Music: An Exercise in Collocating Works," *Cataloging & Classification Quarterly* 9, no. 3 (1989): 97–114.
8. Music Library Association, Emerging Technologies and Services Committee, "Music Discovery Requirements," 2012, accessed October 28, 2013, <http://committees.musiclibraryasoc.org/uploads/ETSC/MDRdocument.pdf>.
9. *Ibid.*, 2.
10. "Bibliographic Framework Transition Initiative," Library of Congress, accessed December 6, 2013, www.loc.gov/marc/transition.
11. "Genre/Form Terms for Musical Works and Medium of Performance Thesaurus," Library of Congress, accessed July 30, 2013, www.loc.gov/catdir/cpsso/genremusic.html.
12. Victoria O'Rourke, "Selection of an Online Public Access Catalog: A Checklist Approach," *Information Technology & Libraries* 6, no. 4 (December 1987): 282; the checklist is reproduced on pages 285–87.
13. Truong Dai Luong and Chern Li Liew, "The Evaluation of New Zealand Academic Library OPACs: A Checklist Approach," *Electronic Library* 27, no. 3 (2009): 376–96; tables appear on pages 380–388.
14. Jason Vaughan, "Investigations into Library Web-Scale Discovery Services," *Information Technology & Libraries* 31, no. 1 (March 2012): 56–58.
15. Malcolm Ramsay and Edmund Chamberlain, "Software Selection Methodology for Library Discovery Layer Systems," FOSS4Lib, accessed July 30, 2013, <http://foss4lib.org/>

- decision-support/discovery-layer-ssm.
16. Yang and Wagner, "Evaluating Discovery Tools," 690–709.
 17. Nara L. Newcomer, "Summon," *Music Reference Services Quarterly* 14, no. 1–2 (2011): 59–62; Rebecca Bedford, "WorldCat Local Enhancement Recommendations for Music," *Music OCLC Users Group Newsletter* 111 (September 2012): 14–18; Lisa Hooper, "Ex Libris's Primo and Musical Research," *Music Reference Services Quarterly* 15, no. 2 (2012): 119–24.
 18. Jody Condit Fagan, "Usability Studies of Faceted Browsing: A Literature Review," *Information Technology & Libraries* 29, no. 2 (2013): 58–66.
 19. Tracey Snyder, "Music Materials in a Faceted Catalog: Interviews with Faculty and Graduate Students," *Music Reference Services Quarterly* 13, no. 3–4 (2010): 66–95.
 20. Verletta Kern, "FirstSearch Advisory Group" (presentation at the annual meeting of the Music OCLC Users Group, San Jose, California, February 27, 2013), accessed July 30, 2013, www.musicocclusers.org/mougmeetings/2013meeting/FirstSearch%20Advisory%20Group.pptx.
 21. Terry Ballard, "Comparison of User Search Behaviors with Classic Online Catalogs and Discovery Platforms," *Charleston Advisor* 12, no. 3 (January 2011): 65–66; Kelly Meadow and James Meadow, "Search Query Quality and Web-Scale Discovery: A Qualitative and Quantitative Analysis," *College & Undergraduate Libraries* 19, no. 2–4 (2013): 163–75.
 22. Many of the access points included as examples in appendix B were provided to programmers at the author's institution in response to requests for MARC examples related to system enhancements in an open-source discovery layer.
 23. The instruction sheets that govern form subdivisions for notated music in the *Subject Headings Manual* are H 1160 (musical compositions) and H 1161 (musical instruments). Library of Congress Cataloging Distribution Service, *Subject Headings Manual*, 1st ed. (Washington, DC: Library of Congress, 2008).
 24. MARC Proposal No. 2012-01, "New Data Elements in the MARC 21 Bibliographic and Authority Formats for Medium of Performance," accessed July 30, 2013, www.loc.gov/marc/marbi/2012/2012-01.html.
 25. This continuation of this practice from AACR2 to RDA is affirmed in the recommended application of the exception for notated music to RDA 3.5.1.6. Music Library Association, Bibliographic Control Committee, RDA Music Implementation Task Force, "Best Practices for Music Cataloging Using RDA and MARC21," draft, February 15, 2013, accessed July 24, 2013, http://bcc.musiclibraryassoc.org/BCC-Historical/BCC2013/RDA_Best_Practices_for_Music_Cataloging.pdf.
 26. Music Library Association, Bibliographic Control Committee, RDA Music Implementation Task Force, "Best Practices for Music Cataloging," 31.
 27. The degree of specificity of identifiable formats can be seen in "MARC 21 Format for Bibliographic Data," particularly the 007-Physical Description Fixed Field, accessed July 24, 2013, www.loc.gov/marc/bibliographic/bd007.html, and in "Searching WorldCat Indexes: Format and Material Type Values Indexed," OCLC, accessed July 30, 2013, www.oclc.org/support/services/worldcat/documentation/searching/search-worldcatindexes.en.html#search_worldcat_materialtypes.fm.
 28. "Searching WorldCat Indexes," OCLC, accessed July 30, 2013, www.oclc.org/support/services/worldcat/documentation/searching/searchworldcatindexes.en.html; confirmed by searches in Connexion Client and WorldCat Local, July 30, 2013.
 29. "Searching WorldCat Indexes"; confirmed by searches in Connexion Client and WorldCat Local, July 30, 2013.
 30. RDA: Resource Description and Access 2.5.2.1 (g) includes "a particular voice range or format for notated music" within the scope of "edition." In the examples following in 2.5.2.2, both "Full score," which in AACR2 would be considered a musical presentation statement, and "Vollständiger Klavierauszug," which would be considered part of a statement of responsibility, are included as examples of designation of edition. *RDA: Resource Description & Access* (Chicago: ALA; Ottawa: Canadian Library Association; London: Chartered Institute of Library and Information Professionals, 2010), accessed July 30, 2013, <http://access.rdatoolkit.org>.
 31. "Searching WorldCat Indexes."
 32. For more about catalog issues related to flats and sharps, see Barbara Henigman and Richard D. Burbank, "Online Music Symbol Retrieval from the Access Angle," *Information Technology & Libraries* 14, no. 1 (1995): 5–16.
 33. The sign is used as a wildcard character in the WorldCat.org, WorldCat Local, and FirstSearch WorldCat interfaces. "WorldCat Help," OCLC, accessed July 20, 2013, www.oclc.org/support/help/worldcatorg/ApplicationHelp.htm; "Searching WorldCat Indexes."
 34. RDA, 2.11.1.3: Recording Copyright Dates.

Appendix A. Checklist Questions for Music-Focused Discovery Tool Assessment

This appendix is a checklist for evaluating treatment and presentation of AACR2 and RDA MARC records in a discovery tool. It is not a comprehensive checklist, but does include general features that have an impact on searching for music resources. The list includes sections exclusive to music, which are clearly identified. All field tags, indicators, and subfields refer to the MARC 21 format.

Many questions are open ended to provide the opportunity for a library to consider its own desired functionality; for yes/

no questions, a “yes” answer does not necessarily represent desired functionality. For indexing and display recommendations related specifically to music, readers may wish to consult the music discovery resources available from the Music Library Association.

General Questions

- Which MARC fields and subfields display?
- How are displayed fields and subfields labeled?
- Are field tags, indicators, or subfields used to generate specific labels?
- Which fields display (1xx through 8xx)? In what order? How are they grouped?
- Is any coded information (LDR/0xx) indexed or displayed in a readable form for the end user?
- How does subfield order within a field compare to the original MARC record?
- Which indexes are available for searching? Which fields/subfields are included in each index?
- Which indexed information is visible in a record?
- Are search terms visible in brief results or single records?
- What information is used to determine facets or limits? How does this compare to search indexes?
- What display, index, and ranking options are customizable?

Headings (controlled subjects and genre/form terms, names, titles)

- Where in the record do headings display? How are they grouped?
- Are headings clickable links?
 - Which subfields within a heading are linked?
 - Are subfields bound together as a single link?
 - Do linked headings generate a keyword search for each term or subfield separately (Boolean AND) without regard to order?
 - In which indexes do linked headings generate a search?
 - Is there an option to link to a user-selected portion of a heading to execute broader or narrower searches (decreasing precision by clicking on subfields from right to left in an access point)?
- Is browse searching available?
 - How should terms be entered?
 - Do terms need to be entered in a specific order?
 - How does a browse search function when terms other than authorized forms of names, titles, or subject/genre headings are entered? Does it make a difference if the terms entered are see references in authority records?
 - Do clickable links on headings generate browse searches?
- What use does the tool make of authority records?

Names

- How and where does the statement of responsibility (245 \$c) display in relationship to the title in the 245 field and names in 1xx/7xx fields?
- Which fields containing names display in brief results (information from 1xx, 7xx, 245 \$c, 508, 511, other)? Is this dependent on format? For example, 1xx for books but 511 for sound recordings.
- Do elements within \$a in name access points display in the desired order?
- Are name access points displayed fully enough for identification and differentiation?
- Which name access points or portions of name access points appear under an author facet?
 - Corporate or conference names as main entry (110, 111)?
 - Names in added entries (700, 710, 711)?
 - Names in series (800, 810, 811)?
 - Names in added entries that contain title (\$t) subfields?
- In single records, are there label or display distinctions between main and added author access points (1xx versus 7xx, 8xx)? Between personal, corporate, conference, or series names?
- Do names in subject fields (600, 610, 611) appear under a subject facet?

Titles of Works and Expressions

- Are preferred titles (130, 240, 7xx \$t with additions, 730) identified or indexed separately from other title access points (245, 246, 740)?
- Is there a separate, additional index for preferred title?
- Are all subfields within a preferred title field linked as a single (bound) search string?
- If access points for preferred titles include names:
 - Do titles in field 240 display with or near the associated name in a 1xx name access point entry?
 - Is a link in field 240 bound to the name in a 1xx name access point (name-title search)?
 - Are links on titles in name-title added entries bound to their associated names?
 - How is a title in a name-title access point displayed in relationship to its associated name? In other words, is it clear who wrote what work?
- If a record contains both name and name-title added entries, how are headings of each type grouped? Does the presence of title subfield (\$t) prompt headings in 7xx name fields to be labeled differently than name headings without titles? For example, “Contributor” versus some sort of label suggesting a work or title.
- Do searches or browses for a numbered work within a number range in a title subfield \$n retrieve records where only the first and last numbers in the range are recorded?

Analytic Entries

- Do analytic title entries (7xx with 2nd indicator “2”) display?
- Are controlled analytic entries (titles in MARC fields 700, 710, 711, 730) differentiated in display, linking, or indexing from uncontrolled analytic entries (740)?
- Are indicators in MARC 7xx name or title fields used to generate a display? For example, “Contains” or “Related title.”

Relationships

- Are relator codes (\$4) or relationship designators (\$e) displayed?
- Are codes displayed in a spelled-out form (“performer” versus “prf”)?
- Is information in relator codes or terms used for additional indexes or facets (performer, conductor, composer, editor, etc.)?
- Does information in 7xx \$i display? Does all information in \$i display? (“Based on (work)” versus “Based on,” etc.)?
- Does the presence of \$i in a 7xx field suppress a general 7xx field label?
- How is data in 7xx \$i handled in browse, keyword, name, or title indexes?
- Is there any linking functionality based on the *RDA* relationships indicated in a subfield \$i (navigation to all parodies, or all works based on a particular play, etc.)?

Subjects

- Do title headings in subject fields (630, 600 \$t and subfields) appear under a subject facet? With associated names?
- Are non-topical subject subdivisions (\$v \$y \$z) distributed over facets other than subject?

Genre/Form

- Is there a genre facet?
- Is there a genre index? Which fields or subfields are included?
- Are genres indexed as subjects?
- Is there an option to search a combined subject/genre index?
- Are form subdivisions (\$v) in subject headings indexed as genres or included under a genre facet?
- How is related coded information for music genre/form (008/18-19, 047) used?

Medium of Performance (music only)

- Are medium of performance fields (382, \$m within title fields 130, 240, 6xx, 7xx) indexed and displayed?
- Is there a separate, additional index for medium?
- Is a customized search interface for medium available?
- How is coded medium information (048) used?

Format Limits, Facets, Icons, and Labels

- What icons, labels, and terms are used?
- What formats are offered in limits/facets? Can multiple formats be selected to expand search results?
- Is there sufficient specificity?
- Are labels logical, precise, and accurate? Do labels reflect content, carrier, media, or a combination?
- Can format(s) be easily identified in brief results and in individual records? How?
- Are multiple formats coded in a single record each indexed and displayed?
- How is the general material designation (245 \$h) used if present?
- How is data in 33x or 34x fields utilized to indicate format or provide facets/limits?

Language Limits, Facet, or Labels

- Does the code for “no linguistic content” (zxx) generate a limit, facet option, or label? What term is used?
- How is coded language information (008/35-37, 041 \$a, \$d) indexed, displayed, or used for limits/facets?
- Are codes for subtitles (041 \$j) treated as a primary language for indexing and limits/facets?
- How is coded information about translations (041 1st indicator, 041 \$h, \$k, \$m, \$n) used?
- Is coded information for accompanying material (041 \$b, \$e, \$f, \$g) or subtitles (041 \$j) indexed, displayed, or used for limits/facets? Are there more detailed facets based on the subfield definitions in 041?
- How is field 377 (associated language) indexed or displayed?

All Notes (5xx)

- Which notes fields display? Where do they appear in single records?
- Do repeatable fields display?
- In what order do notes appear (MARC record order, MARC numeric tag order, custom order)?
- Are notes distributed among multiple tabs or areas of a bibliographic record?
- How are notes indexed? Are notes or subfields included in multiple indexes?

Language/Notation Note (546)

- How is subfield \$b indexed or labeled?
- How is related coded information (008/35-37, 041) used?

Performer/Cast Information Note (511)

- Does information appear instead of or with statement of responsibility (245 \$c) in brief results or single records?
- Is information in this note also indexed in an author index?

Recording Information Note (518)

- How are subfields \$d, \$p, and \$o indexed, displayed, or labeled? Does information in \$3 display?
- How is related coded information (033) used?

Formatted Contents Note (505)

- Is the entire field for non-enhanced notes (\$a) included in author or title indexes?
- Are different subfields in enhanced contents notes indexed in appropriate indexes in addition to keyword: author index (\$r) and title index (\$t)? Is information in \$g indexed?
- Is punctuation within contents notes used to generate line breaks or layout?

Edition Information (254) (music only)

- Is any distinction in indexing or display made between fields 250 (edition) and 254 (musical presentation)?

Publisher, Music, or Plate Numbers (028) (music emphasis)

- Is there a separate, additional index for music number (028 \$a)?
- Is the publisher information in 028 \$b included in a publisher index?
- Do searches or browses for a publisher number within a consecutive range retrieve records where only the first and last numbers in the range are recorded in 028 \$a?

Diacritics, Special Characters, and Stop Words (music emphasis)

- Do diacritics, sharps, flats, special characters, and the phonogram/copyright symbols display properly?
- Do the words “sharp” or “flat” generate searches for the respective symbols?
- Is there a way to enter sharp and flat signs from the search interface?
- Does the pound sign (#) function as a sharp sign?
- Does the pound sign (#) function as a wildcard operator?
- Do symbols pasted into a search function as those symbols?
- Does retrieval of records with diacritics require searches to be entered with diacritics?
- Is phrase searching possible?
- Can potential stopwords such as “a” or potential Boolean operators such as “no” be forced to function as search terms if enclosed in quotation marks?

Appendix B. Sample Searches, Authorized Access Points, and Titles for Music-Focused Discovery Tool Assessment

Four types of examples follow: searches, WorldCat command searches, authorized access points, and titles with excerpts of bibliographic records from WorldCat.

1. Searches

Searches may be conducted in a discovery tool to test indexing, to retrieve a set of results to explore facets and brief results, or to retrieve records to investigate display and linking functionality. Curly brackets [{}] surround single searches, and terms within a single search are assumed to be combined (Boolean AND). Any quotation marks included within brackets are intended as part of the search query. Searches without any index indicated are assumed to be general keyword searches. Searches are assumed not to be case-sensitive; titles within search strings are not capitalized.

2. WorldCat Index Command Searches

In a few cases, WorldCat index command searches for use with OCLC’s products that share indexes (Connexion, Cat Express, FirstSearch, WorldShare, WorldCat Resource Sharing) are included, limited to cases where a discovery tool is unlikely to index the affected fields or where there are insufficient examples in WorldCat at the time of writing. These searches can help identify resources held by a library that can then be searched in a local system. Examples are shown with an optional limit by holding library, with DLC (the symbol for Library of Congress in OCLC) used as an example.

3. Authorized Access Points

Authorized access points may be used as a basis for searches. These are given with full MARC coding, which may be useful for back-end customization or comparison with public record views. Authorized access points should be compared against the authority file to ensure that the most recent form is being used.

4. Titles with Excerpts of Bibliographic Records from WorldCat

Titles and excerpts of bibliographic records from OCLC's WorldCat database illustrate various topics. Examples were selected based on a relatively large number of holding institutions in WorldCat and accuracy in coding of the field(s) in question; titles demonstrating multiple topics were given preference. The format is indicated, followed by title and OCLC accession number. Relevant MARC fields are reproduced below the title. MARC field tags and subfield delimiters are retained in examples when needed for comparison with local catalogs or for internal systems use, with indicators included only if necessary, with “#” for blanks.

The topics illustrated by each set of examples are identified, followed by the type of example.

Names. Corporate names contained in access points. Searches:

{Beatles}
 {Boston Pops Orchestra}
 {Boston Pops Orchestra DVD}
 {Bayerischer Rundfunk Orchester}

Names. Access points representing contributors. Searches:

{filmed operas}
 {Beethoven Bernstein}
 {Mozart Da Ponte operas}
 {Bach Busoni arranged}

Names. Personal, corporate, and conference names in direct order or where subfields other than \$a are needed for accurate linking or identification. Authorized access points:

100 1# Adams, John, \$d 1947-
 100 1# Williams, John, \$d 1932-
 100 0# Madonna, \$d 1958-
 100 0# Hildegard, \$c Saint, \$d 1098-1179
 100 0# Alfonso \$b X, \$c King of Castile and Leon, \$d 1221-1284
 100 1# Beach, H. H. A., \$c Mrs., \$d 1867-1944
 100 1# Bériot, Ch. de \$q (Charles), \$d 1802-1870
 110 2# Mariinskiĭ teatr (1991-). \$b Balet
 110 2# Metropolitan Opera (New York, N.Y.). \$b Orchestra
 111 2# Bayreuther Festspiele. \$e Orchester
 111 2# Aspen Music Festival. \$e Contemporary Ensemble

Titles. Distinctive titles, shown with the composer's name and partial or full authorized form of a work title, paired with a corresponding search for the commonly used English title. Searches:

{Stravinsky zhar-ptitsa}
 {Stravinsky firebird}
 {Bach brandenburgische konzerte}
 {Bach brandenburg concerto}
 {Vivaldi cimento dell'armonia}
 {Vivaldi four seasons}
 {Smetana prodana nevesta}
 {Smetana bartered bride}

Titles. Generic titles, shown with the composer's name and work's nickname, paired with a corresponding search for known elements of the title in the work's authorized access point. Searches:

{Beethoven moonlight}
 {Beethoven sonatas piano 14 27 2}
 {Tchaikovsky pathétique}
 {Tchaikovsky symphonies 6 74}
 {Bach little fugue}
 {Bach BWV 578}

Titles. Titles containing additions in subfields following \$a/\$t (shown with titles in \$t). Authorized access points:

Beethoven, Ludwig van, \$d 1770-1827. \$t Symphonies, \$n no. 3, op. 55, \$r E ♭ major
 Beethoven, Ludwig van, \$d 1770-1827. \$t Symphonies, \$n no. 3, op. 55, \$r E ♭ major; \$o arranged
 Beethoven, Ludwig van, \$d 1770-1827. \$t Sonatas, \$m piano, \$n no. 14, op. 27, no. 2, \$r C # minor
 Janáček, Leoš, \$d 1854-1928. \$t Věc Makropulos. \$l English
 Mozart, Wolfgang Amadeus, \$d 1756-1791. \$t Zauberflöte. \$s Vocal score. \$l English

Note: "Selections" in \$k followed by a full stop typically follows the last subfield in authorized access points for work or compilations of, as in:

Beethoven, Ludwig van, \$d 1770-1827. \$t Symphonies, \$n no. 3, op. 55, \$r E ♭ major. \$k Selections
 Beethoven, Ludwig van, \$d 1770-1827. \$t Symphonies, \$n no. 3, op. 55, \$r E ♭ major. \$k Selections; \$o arranged
 Beethoven, Ludwig van, \$d 1770-1827. \$t Sonatas, \$m piano. \$k Selections

Titles. Titles of parts of works (whole-part), shown with titles in \$t. Authorized access points:

Named parts:

Wagner, Richard, \$d 1813-1883. \$t Ring des Nibelungen. \$p Götterdämmerung
 Mozart, Wolfgang Amadeus, \$d 1756-1791. \$t Zauberflöte. \$p Hölle Rache
 Schumann, Robert, \$d 1810-1856. \$t Frauenliebe und Leben. \$p Du Ring an meinem Finger
 Rossini, Gioacchino, \$d 1792-1868. \$t Guillaume Tell. \$p Overture
 Marais, Marin, \$d 1656-1728. \$t Pièces en trio. \$p Suite, \$r G minor

Numbered parts:

Bach, Johann Sebastian, \$d 1685-1750. \$t Englische Suiten. \$n Nr. 3
 Vivaldi, Antonio, \$d 1678-1741. \$t Cimento dell'armonia e dell'inventione. \$n N. 4

Named parts of numbered parts:

Bach, Johann Sebastian, \$d 1685-1750. \$t Brandenburgische Konzerte. \$n Nr. 3. \$p Allegro
 Vivaldi, Antonio, \$d 1678-1741. \$t Cimento dell'armonia e dell'inventione. \$n N. 4. \$p Allegro non molto

Titles. Titles containing repeated subfields in varying configurations; subfield order indicated before each, shown with titles in \$t. Authorized access points:

\$t \$m \$n \$n

Corelli, Arcangelo, \$d 1653-1713. \$t Trio sonatas, \$m violins, continuo, \$n op. 1. \$n No. 4

\$t \$m \$n \$n \$p

Mendelssohn-Bartholdy, Felix, \$d 1809-1847. \$t Lieder ohne Worte, \$m piano, \$n op. 30. \$n Nr. 6, \$p Venezianisches Gondellied

\$t \$m \$n \$p \$n \$p

Bach, Johann Sebastian, \$d 1685-1750. \$t Sonaten und Partiten, \$m violin, \$n BWV 1001-1006. \$p Partita, \$n no. 2. \$p Chaconne

\$t \$n \$n

Bach, Johann Sebastian, \$d 1685-1750. \$t Wohltemperierte Klavier, \$n 1. T. \$n Nr. 1

\$t \$n \$n \$p

Wagner, Richard, \$d 1813-1883. \$t Tristan und Isolde. \$n 3. Aufzug. \$n 1. Szene \$p Mässig langsam

\$t \$n \$p \$n

Brahms, Johannes, \$d 1833-1897. \$t Lieder und Gesänge, \$n op. 63. \$p Junge Lieder, \$n no. 1

\$t \$n \$p \$p

Palestrina, Giovanni Pierluigi da, \$d 1525?-1594. \$t Masses, \$n book 2. \$p Missa Papae Marcelli. \$p Credo

\$t \$n \$r \$p \$p

Beethoven, Ludwig van, \$d 1770-1827. \$t Symphonies, \$n no. 9, op. 125, \$r D minor. \$p Presto. \$p Allegro assai

\$t \$p \$n \$p

Bach, Carl Philipp Emanuel, \$d 1714-1788. \$t Versuch über die wahre Art das Clavier zu spielen. \$p Sonaten. \$n Nr. 6.

\$p Fantasia

\$t \$p \$p

Wagner, Richard, \$d 1813-1883. \$t Ring des Nibelungen. \$p Götterdämmerung. \$p Siegfrieds Rheinfahrt

\$t \$p \$p \$p

Wagner, Richard, \$d 1813-1883. \$t Ring des Nibelungen. \$p Götterdämmerung. \$p Brünnhildes Schlussgesang. \$p Grane, mein Ross!

Titles. Preferred titles constructed without association names. Authorized access points:

Singin' in the rain (Motion picture)

Beggar's opera

Ah! vous dirai-je, maman

Kleine Präludien und Fugen

Concerto, \$m bassoon, string orchestra, \$n GraunWV Cv:XIII:125, \$r F major

Analytic entries. Records likely to contain name-title analytic entries/access points. Searches:

{Donizetti Mozart}

{Mussorgsky Dukas}

{Mozart jupiter linz}

{cavalleria pagliacci}

{soprano arias songs}

{music women composers}

Titles/analytic entries (name-title)/contributor access points. WorldCat examples:

[score] Later symphonies : full orchestral score of Symphonies 35-41. #1380022

[score] Mannheim symphonists. #5903406

[CD] Carreras, Domingo, Pavarotti in concert. #22433437

[CD] The 3 tenors in concert 1994. #31042466

[CD] Voice of the violin. #71222188

[DVD] Stravinsky et les Ballet russes. #451510365

Relationships. Relationship information indicated in relator designators in 100/700 \$e and in relationship information in 700 \$i. WorldCat examples:

[score] Rinaldo and Armida / John Eccles. #769766464

100 1# Eccles, John, \$d -1735, \$e composer.

700 1# Dennis, John, \$d 1657-1734, \$e librettist.

700 1# Plank, Steven Eric, \$e editor.

700 1# \$i Libretto based on (work): \$a Tasso, Torquato, \$d 1544-1595. \$t Gerusalemme liberata.

[CD] Symphony no. 2 ; Four Shakespeare preludes / Joachim Raff. #826876216

700 1# \$3 2nd work \$i Based on (work): \$a Shakespeare, William, \$d 1564-1616. \$t Tempest.

700 12 \$i Contains (work): \$a Raff, Joachim, \$d 1822-1882. \$t Orchester-Vorspiel zu Shakespeare's Sturm.

Subjects. Records likely to contain name and/or name-title headings used as subjects. Searches:

{Wagner ring nibelungen}

{Bach johannespassion}

Physical description. Records containing multiple subfields \$a and \$c in a 300 field or multiple occurrences of the 300 field.

WorldCat index command searches:

{p3:study parts mt:sco li:DLC} (RDA)

{p3:miniature parts mt:sco li:DLC} (AACR2)

{p3:miniature parts mt:sco yr:201? li:DLC} (AACR2)

Physical description. Records containing multiple subfields \$a and \$c in a 300 field. WorldCat examples:

[score] Theme and variations for flute and string quartet, op. 80 / Amy Beach. #35170538

300 1 miniature score (37, 4 p.) ; \$c 22 cm. + \$a 5 parts ; \$c 28 cm.

[score] Tríptico : for guitar and string quartet / Roberto Sierra. #24308364

300 1 miniature score (29 [i.e. 15] p.) : \$b port. ; \$c 23 x 31 cm. + \$a 5 parts ; \$c 31 cm.

[score] A hundred thousand stars / Jake Heggie. #730034330

300 1 score (9 pages) ; \$c 31 cm. + \$a 1 vocal score (6 pages) ; \$c 28 cm + \$a 5 parts ; \$c 31 cm.

Physical description. Records representing a multiple-format resource likely to contain \$e in a 300 field or in a repeated 300 field; presence of 006, 007(s).

{scores recorded accompaniments}

{lead sheets recorded accompaniments}

{Jamey Aebersold jazz series}

Physical description. Records representing a multiple-format resource, likely to contain \$e in a 300 field or a repeated 300 field; presence of 006, 007(s). WorldCat index command searches:

{mt:sco mt:rec li:DLC}

{dx:rda mt:sco mt:cda li:DLC}

{dx:rda mt:sco mt:dvd li:DLC}

Physical description. Records representing a multiple-format resources represented in \$e in a 300 field or in a repeated 300 field; presence of 006, 007(s). WorldCat examples:

[score accompanied by CD]

Standard vocal literature : soprano . . . / edited by Richard Walters. #57732332

006 jsgnn n

007 s \$b d \$d f \$e n \$f n \$g g \$h n \$i n \$j m \$k m \$l n \$m e \$n u

300 1 score (136 p.) ; \$c 31 cm. + \$e 2 sound discs (digital ; 4 3/4 in.)

[score accompanied by CDs]

Complete guide to learning the Irish tin whistle / by Clare McKenna. #809031465

006 jfmnn n

007 s \$b d \$d f \$e s \$f n \$g g \$h n \$i n \$j m \$k m \$l n \$m e \$n u

300 1 score (96 pages) ; \$c 30 cm

300 2 audio discs (53:25; 72:39) : \$b digital, CD audio, stereo. ; \$c 4 3/4 in.

[CD accompanied by DVD]

One by one / Foo Fighters. #50852655

006 g--- vl

007 s \$b d \$d f \$e s \$f n \$g g \$h n \$i n \$j m \$k m \$l n \$m e \$n d

007 v \$b d \$d c \$e g \$f a \$g i \$h z \$i u

300 1 sound disc (55 min.) : \$b digital ; \$c 4 3/4 in. + \$e 1 videodisc (DVD : sd., col. ; 4 3/4 in.)

[book accompanied by CD and DVD]

Give my poor heart ease : voices of the Mississippi blues / [interviews by] William Ferris. #317929511

006 jblnn n

006 g--- vl

007 s \$b d \$d f \$e u \$f n \$g g \$h n \$i n \$j m \$k m \$l n \$m e \$n u

007 v \$b d \$d b \$e v \$f a \$g i \$h z \$i u

300 xiv, 302 p. : \$b ill., map ; \$c 25 cm. + \$e 1 sound disc (4 3/4 in.) + 1 videodisc (DVD : sd., col. ; 4 3/4 in.)

[book accompanied by CD]

The southern journey of Alan Lomax : words, photographs, and music / with an essay by Tom Piazza ; introduction by

William R. Ferris. #783162479

006 jmunnn n

007 s \$b d \$d f \$e n \$f n \$g g \$h n \$i n

300 134 pages : \$b illustrations ; \$c 25 cm + \$e 1 audio disc (digital ; 4 3/4 in.)

Format. Recordings that contain 34x fields. WorldCat index command searches:

```
{dx:rda en:mp3 mt:msr li:DLC}
{dx:rda en:analog mt:msr li:DLC}
```

Language. Records likely to contain codes in 041 and note indicating the language(s) of translations or accompanying material. Searches:

```
{Lieder English French}
{songs texts translations}
{biographical notes container}
{critical report English German score}
{symphonies scores English German}
{recent researches music scores}
```

Language. Records likely to contain coding for single works composed using multiple languages. Searches:

```
{Benjamin Britten war requiem}
{Carl Orff carmina burana}
```

Language. Various language code configurations in the 041 field. WorldCat examples:

```
[score] Sixth and seventh symphonies / Ludwig van Beethoven. #2717378
008/35-37 zxx
041 0# $g eng
500 Introductions by W. Altmann and prefaces by Max Unger: p. [iii]-[xiii].
[score] Luisa Miller / Giuseppe Verdi. #56357984
008/35-37 ita
041 1# ita $a eng $h ita $g ita $g eng
546 Italian and English words.
500 Includes pref., introd., and critical commentary in Italian and English.
[score] Standard vocal literature : tenor / edited by Richard Walters. #57733832
008/35-37 eng
041 1# eng $a fre $a ger $a ita $a spa $e eng $e fre $e ger $e ita $e spa $n fre $n ger $n ita $n spa $g eng
546 English, French, German, Italian, and Spanish words; also printed as texts with English translations preceding each
song.
[CD] Carreras, Domingo, Pavarotti in concert. #22433437
008/35-37 ita
041 1# $d ita $d fre $d ger $d spa $d eng $d rus $e ita $e fre $e ger $e spa $e eng $n ita $n fre $n ger $n spa $g eng $g
ita
546 Sung in Italian, French, German, Spanish, English, and Russian.
500 Program notes by Monica Rosolen in Italian and English, and texts (except medley) with English translations (29 p.
: ports.) inserted in container.
[DVD] Carmen / Georges Bizet . . . Metropolitan Opera. #665177103
041 1# fre $a eng $j fre $j ger $j eng $j spa $j chi $g eng
546 Sung in French; French, German, English, Spanish or Chinese subtitles; spoken commentary in English.
500 Program notes and synopsis in English (20 p. : ports. ; 18 cm.) inserted in container.
```

Note: notation/alphabet. Records containing \$b in a 546 field. WorldCat examples:

```
[score] Rinaldo and Armida / John Eccles ; edited by Steven Plank. #769766464
546 English words.
546 $b Staff notation.
[score] Messiah / George Frideric Handel ; edited by Alfred Mann. #19974051
546 English words.
546 $b Staff notation.
```

Note: performer/cast. Determining indexing of the 511 field in an author index. Author index keyword searches:

{“Tokyo String Quartet”} (transcribed in 511)
 {“Tokyo Gengaku Shijusodan”} (form in heading, macrons omitted)
 {“Meat Loaf Aday”} (transcribed in 511, *Fight Club*)
 {“Meat Loaf vocalist”} (form in heading)
 {Stoltzman clarinet}

Note: place/date. Records with recording place/date information recorded in a formatted 518 field. WorldCat examples:

[CD] Maria di Rohan / Donizetti. #764337591
 518 \$o Recorded \$d 2009 October-November \$p Henry Wood Hall, London.
 [CD] Symphony no. 6 in E minor / Vaughan Williams. The sea / Bridge. #832457650
 518 \$3 First work \$o Recorded live \$p BBC Proms \$d 16 August 1972.
 518 \$3 Second work \$o Recorded live \$p BBC Hoddinott Hall \$p Cardiff Bay, Wales \$d 3 January 2013.

Note: contents. Records containing enhanced contents note in the 505 field. WorldCat examples:

[CD] Ken Burns jazz. #45588616
 505 10 \$g Disc 1: \$t Star dust \$r (Louis Armstrong & his Orchestra) . . .
 The record contains enhanced contents notes (505, with subfields \$g, \$t, and \$r present) with titles that do not appear elsewhere in the bibliographic record. Some performers in subfields \$r are included in added entries.
 [CD] Born this way / Lady Gaga. #706505238
 505 00 \$Marry the night -- \$g Born this way -- \$t Government hooker . . .
 This record contains an enhanced contents note with subfields \$t. All titles except “Born this way” do not appear elsewhere in the bibliographic record.

[CD] The 2006 (#61343821) and 2010 (#374374691) editions of the *Norton Recorded Anthology of Western Music* contain enhanced contents notes with titles and composers that do not appear anywhere else in the records.

Edition. Records containing the 254 field (AACR2). WorldCat examples:

[score] Streichquartett, 1997 / Georg Friedrich Haas. #783120793
 254 Studienpartitur.
 300 1 score (37 p.) ; \$c 30 cm.
 [score] A colorful symphony / Robert Xavier Rodriguez. #37304903
 254 Full score.
 300 1 miniature score (65 p.) ; \$c 31 cm.

Publisher number/publisher. Records recording multiple publishers in repeated 028 fields. Determining display and indexing. WorldCat examples:

[score] Dix mélodies (1878) / Camille Saint-Saëns. #190861230
 028 32 1269 \$b Recital Publications
 028 20 A C 3904 \$b A.C. Choudens
 260 Huntsville, TX : \$b Recital Publications, \$c 2007.
 500 Reprint. Originally published: Paris : A.C. Choudens, 1878. Pl. no. A C 3904.
 [CD] Paul Chambers. #54313915
 028 00 MS-005 \$b Mosaic Records
 028 00 LP 7 \$b Jazz West
 028 00 BLP 1564 \$b Blue Note
 260 Stamford, CT : \$b Mosaic Records, \$c p2003.
 500 Previously released recordings, principally on Jazz West LP 7 (Chambers’ music), Blue Note BLP 1534 (Whims of Chambers), Blue Note BLP 1564 (Paul Chambers Quintet), and Blue Note BST 81569 (Bass on top).
 [CD] Ken Burns jazz. #45588616
 028 00 C5K 61432 \$b Columbia/Legacy
 028 00 CK 61433--CK 61437 \$b Columbia/Legacy
 028 00 61432-2 \$b Columbia/Legacy
 500 Columbia/Legacy: C5K 61432 (CK 61433--CK 61437).

Musical sharps, flats. Determining display and search functionality. Searches:

{Beethoven Ludwig symphonies 3 55 E flat major}
 {Beethoven Ludwig symphonies 3 55 "E flat major"}
 {Beethoven Ludwig symphonies 3 55 E ♭ major}
 {Beethoven Ludwig symphonies 3 55 "E ♭ major"}
 {Beethoven Ludwig sonatas piano 14 27 C# minor} (pound sign)
 {Beethoven Ludwig sonatas piano 14 27 C # minor} (musical sharp)

Diacritics, special characters, sharps, flats. Names or titles containing sharps, flats, diacritics, or characters, shown with titles in \$t. Authorized access points:

Beethoven, Ludwig van, \$d 1770-1827. \$t Sonatas, \$m piano, \$n no. 14, op. 27, no. 2, \$r C # minor
 Dvořák, Antonín, \$d 1841-1904. \$t Humoresques, \$m piano, \$n B. 138, \$r F # major
 Dvořák, Antonín, \$d 1841-1904. \$t Symphonies, \$n no. 2, op. 4, \$r B ♭ major
 Mozart, Wolfgang Amadeus, \$d 1756-1791. \$t Zauberflöte
 Stravinsky, Igor, \$d 1882-1971. \$t Zhar-ptitsa [ligature over the "ts" in "ptitsa"]
 Takemitsu, Tōru. \$t Distance de fée
 Cage, John. \$t Four³
 Ligeti, György, \$d 1923-2006. \$t Traümen Sie in Farbe?
 Haanstra, Mark, \$d 1974- \$t Y=6 afr8 of 7?
 1+1 (Harmonia Mundi France (Firm))

Phonogram symbol. Records containing the phonogram symbol © in field 260 \$c or 264#4 \$c. WorldCat examples:

[CD] Piano trio no. 1 in C minor, 'Poème', op. 8 . . . / Shostakovich. # 729876690
 260 London, England : \$b Hyperion Records Ltd., \$c [2011], ©2011.
 [CD] Anthems / Anthrax. #827267522
 264 #1 [New York City] : \$b Megaforce Records, \$c [2013]
 264 #4 \$c ©2013

Stopwords/Boolean operators. Determining search functionality. Searches:

{Bach inventions a minor}
 {Bach inventions "a minor"}
 {Beethoven eroica no 3}
 {Beethoven eroica "no" 3} or {Beethoven eroica "no 3"}

Book Reviews

Norm Medeiros

Library 2020: Today's Leading Visionaries Describe Tomorrow's Library. Edited by Joseph Janes. Plymouth, UK: Scarecrow, 2013. 161 p. \$45.00 paperback (ISBN: 978-0-8108-8714-5).

Librarians, despite the inherently conservative nature of their role in the preservation of knowledge, spend a considerable amount of time looking forward. Joseph Janes, chair of the University of Washington's Information School and longtime *American Libraries* columnist, has brought together a variety of thinkers to answer the question, "The library in 2020 will be ____." Participants were selected by Janes from among his friends and "some people [he] admire[s] a great deal" (v). The year 2020 was selected as being "far enough out that some exciting things might well have happened, but not so far out as to have to resort to shiny-jump suit and hovercar predictions left over from 1965 about 2000" (v). The selections are organized into six sections along thematic lines. These sections include "Stuff," "People," "Community," "Place," "Leadership and Vision," and Janes's own thoughts in a section titled "My Turn." Most of the selections blur these boundaries, but their placement accurately reflects the main thrust of each essay.

The Annoyed Librarian opens the discussion with a dystopian image of a library world where collections are no longer available to lend. She foresees a future where e-book, video, and music licensing becomes so restrictive that distribution of these items is impossible. Kristin Fontichiaro follows by suggesting that "libraries can no longer count on describing themselves as the repositories for stuff" (7). She goes on to describe an even more vibrant future in 2020 in which libraries are

"makerspaces" where community members come together to learn from each other and create. The final two essays in this section echo these themes as Elisabeth Jones describes the effect of large-scale book digitization projects on the library's role as book warehouse and the changing role of librarians within this regard. Clifford Lynch reminds readers of potential barriers to access that these changes might entail as libraries shift to greater licensed and fewer owned collections.

The second section deals with the most important resource in any library: people. Sarah Houghton suggests a future where libraries are staffed and managed by technologically sophisticated individuals whom she describes as "benign geek librarian overlords" (35). In his essay, Stephen Abram posits that "the library in 2020 will be *everywhere*" (41). He goes on to describe the changing roles of librarians as they spend more time delivering programs and providing individual assistance to patrons. He too emphasizes that the days of the library as book repository are at an end. Courtney Greene considers a wide range of possibilities, but comes back to what she considers "the enduring value of our work," which lies in "serving and supporting our communities" (53) regardless of how things might change technologically. Like Abram, Marie Radford sees the library in 2020 as being accessible from anywhere via mobile apps of increasing sophistication, and like Houghton she sees a need for librarians to become technological leaders. James Rosenzweig closes the section by describing his vision of the library as "an information base camp" and librarians as "guides" (63).

The essayists discussing the library of 2020 within the context of community describe the library as "essential for the success of its community" (77), "the vibrant hub of its community" (99), "better than ever" (95), and even "your best friend" (71). This optimism by no means implies that the library of 2020 will remain unchanged from today. To retain their central role in the community, libraries of all types will not only have to become focused on community engagement and remain responsive to the needs of their patrons, but will need to serve as technological change agents.

In discussing the concept of library as place, the essayists feel that physical buildings will remain or grow in importance, but that library services will need to exist beyond these narrow confines. As patrons obtain mobile devices and more resources become accessible through them, libraries will need to provide services wherever and whenever patrons desire. Bill Ptacek describes the library in 2020 as being "a concept more than a place" (117). As discussed in the previous sections, the library will be less a storehouse of materials and more a location where the community gathers.

The final major section of the book discusses the leadership and vision that will be needed to transform the libraries of today into the libraries of 2020. Josie Barnes Parker emphasizes the importance of "fiscal oversight" and "realistic projections" (129) in building the kind of future that the other essayists envision. Mary Ann Mavrinac states that before progress can be made libraries must recognize the need to change, and must be proactive in moving the library forward. As a needed counterpoint, Daniel Chudnov describes a

different, darker future where the race to reinvent libraries has left them as a poor second choice in their emerging role of digital content provider, while adversely affecting their capacity to provide traditional analog services. In the book's final essay, Janes reminds readers that libraries are "not [solely] playing a short-term game" (153). He suggests that libraries need to continue justifying to their communities that the services they provide are important, and that libraries are well equipped to provide them.

Most of the essays described above are positive and hopeful, though a few see more challenges and barriers ahead than opportunities. A couple even caution about making changes too quickly in response to technological advances, echoing in some ways Nicholson Baker's reflections on the rush to microfilm newspaper and other collections described in his book, *Double Fold*. Given that libraries are custodians of the world's cultural and intellectual heritage, and recognizing that decisions are sometimes irreversible, these cautions should be at the forefront for librarians. Nonetheless, the one thing that each of the essayists and Professor Janes agree on is that libraries are in a time of great change, and that librarians need to adapt quickly to continue meeting patron needs and professional responsibilities for the treasures they hold in trust.—*John E. Adkins (johnadkins@ucwv.edu), University of Charleston, Charleston, West Virginia*

The E-book Revolution: A Primer for Librarians on the Front Lines.

By Kate Sheehan. Santa Barbara, CA: Libraries Unlimited, 2013. 146 p. \$50 paperback (ISBN: 978-1-61069-183-3).

The e-book Revolution: A Primer for Librarians on the Front Lines provides a 360-degree panorama of the ever-changing e-book landscape. Its author, Kate Sheehan, composes a section for each of "the big picture issues around e-books," starting with

those related to hardware, formats, distribution, and access, then addressing concerns directly related to libraries, like pricing and lending (xi). The final part of the book considers the position of libraries in the e-book landscape and the unique horizon ahead for them. Although the text's primary focus is to help public librarians grasp the many issues surrounding e-books, the chapters titled "Readers," "Problem Solvers," and "Scenarios for the Future" paint an inspiring portrait of the library's role in the digital age and are worth reading for anyone interested in the future of librarianship.

In the opening paragraphs, Sheehan addresses the million-dollar question: Will e-books replace print texts? She uses an apt comparison with radio and television to show e-books are not completely replacing print. Part of the reason for the limited influence of e-books, Sheehan points out, is the hardware and format wars. Much of chapter 1 provides baseline information about various e-reader devices and their many proprietary software formats. As Sheehan insinuates, a large problem in the industry, ironically, is that the universal format, EPUB, plays on every reading device except the most popular, Amazon's Kindle (7).

Chapter 2, cleverly titled "The Rules of the Road," begins the text's attempt to navigate readers through the winding roads of e-book ownership, distribution, and publishing. Here Sheehan quickly looks at digital rights management, copyright, and the first-sale doctrine and their effect on traditional library lending practices. Just as the slow-moving vehicle sign is unfamiliar to a city driver, e-book acquisition is new to libraries. According to Sheehan, "The current e-book market requires us not only to purchase books that aren't objects, but to purchase books we may not own" (23). The sections that follow present an even more confusing image for libraries, one that makes determining who reads, sells, and purchases e-books

akin to negotiating a four-way stop when all cars arrive simultaneously. Chapter 3 examines data about e-book reader habits from Pew's *Internet & American Life Project* and briefly delves into what e-book vendors sell to public, academic, and school libraries. Chapter 4 explores the "big six" publishers—HarperCollins, Penguin, Macmillan, Random House, Simon and Schuster, and Hachette—their history with e-books, whether they supply to libraries, and how they price their digital editions.

Midway through the book, Sheehan turns the discussion from the physical environment of e-books to their effect on the traditional book ecosystem. Libraries are a main player in this ecosystem, and Sheehan spends quite a bit of time describing this exceptional and difficult position. According to Sheehan, "Libraries are caught between patron expectations, vendor restrictions, and publishers' demands" (75). Chapter 5 investigates the complex relationship libraries have with vendors. When it comes to promoting discoverability, libraries and e-book vendors are allies; but advocating for interlibrary loan privileges and against egregious pricing models have put libraries at odds with these same vendors. Chapter 6 touches on the demands e-books place on public, academic, and school libraries, and chapter 7 explores how accessibility issues tied to electronic texts are affecting libraries' relationships with readers.

In the book's final sections, Sheehan shifts to solutions and looks toward the future. Here she does an excellent job reporting innovative e-book initiatives and delivering a rousing perspective on changes in librarianship. Chapter 8 briefly covers several encouraging stories, like Douglas County Libraries' homegrown e-book program, Ann Arbor District Library's local history digital archive, and Gluejar's Kickstarter-like platform to deliver open access e-books chosen and

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funded by readers. These stories have a common theme of community outreach that Sheehan ponders in the final chapter. As long as proprietary software formats and restrictive digital rights management exist, Sheehan believes readers will be trapped “in their own walled gardens” (113). She feels that engaging communities of readers and colleagues may be the only way to break down these barriers and keep libraries alive.

This short book provides an exhaustive overview of the current e-book environment. At times, the density of information is dizzying, as Sheehan carries readers back and forth through circumstances in different libraries and marketplace conditions. While the book is a must-read for public librarians tossed into the digital fray, it will not serve the needs of every e-book enthusiast. For those who want in-depth coverage on specific aspects of e-books, this title is not for you. Yet the book is easy to negotiate with chapters that are titled informatively and that contain double-lined boxes of additional information. It's the perfect beginning for the e-book novice.—*Brian Norberg (brnorber@ncsu.edu), North Carolina State University, Raleigh, North Carolina*

Information Resource Description: Creating and Managing Metadata.

By Philip Hider. Chicago: ALA Editions, 2013. 220 p. \$99.95 softcover (ISBN: 978-0-8389-1201-0).

This book about descriptive metadata specifically for use in information retrieval systems is divided into nine chapters and includes lists of selected resources, further reading, and metadata standards. In his latest book, Philip Hider discusses metadata produced by information professionals, authors, users, and computers in broad terms. It is not a manual, but an introduction to the field intended for students and practitioners looking for bigger picture. Hider had previously co-authored a book with Ross Harvey

on metadata and information organization titled *Organising Knowledge in a Global Society: Principles and Practice in Libraries and Information Centres* (Chandos, 2008).

Information Resource Description focuses on how information resources are organized through their description (metadata) in the contemporary environment and the process of description and metadata as related to retrieval tools. The author addresses questions such as, Why are descriptive metadata critical? In what contexts do metadata exist? When do metadata work and when not?

After a brief introduction to the vocabulary and defining of scope, the book dives into the concept of information resource attributes to look at the nature of metadata and why metadata are needed. Both describer and user contexts are important to consider: “Metadata creators should all start with the same fundamental question: what metadata will most help users to obtain the information they are looking for?” (16). A variety of information-seeking styles and goals are identified through review of several decades of literature on this topic. Information resource contexts are also considered, as are particular information resources designed for specific uses.

Tools and systems are the other side of the coin in understanding metadata's role in information retrieval. The author describes organizing information as arranged, labeled, and indexed to improve effective access, drawing from examples such as bibliographic databases, library catalogs, archival finding aids, and museum registers. A variety of metadata sources are also compared. Resource creators, publishers, indexes and abstracts, and computers are examples of metadata sources. “In a world so full of information, some might wonder why people need help finding it. The more information there is, however, the more difficult it is to find the best information” (61). To make use of the flood of information

resources, one needs informationseeking and literacy skills and effective information-retrieval tools.

Metadata quality is vital and can be assessed by its functionality, comprehensiveness, accuracy, clarity, and consistency. Vocabulary and authority control, principles of best practice, and quality assurance are discussed as ways to improve metadata quality. Higher quality generally means higher cost, so cost-benefit analysis is covered in this discussion as well.

Metadata standards are needed to facilitate sharing. In a chapter that looks unavoidably a bit like alphabet soup, the author looks at standards created for elements, format, and transmission. These standards are divided among web publishing, libraries, digital libraries, archives, museums, book publishing, book indexing, database indexing, e-research (for example data repositories), education, audiovisual industries, business, government, and registries. Second, the author looks at vocabularies as standards for metadata values, and discusses controlled subject vocabularies, subject headings, subject thesauri, subject classification schemes, taxonomies and ontologies, nonsubject vocabularies, vocabulary mapping, and identification systems.

The final chapter of the book considers the future of metadata and prospects for different approaches to information retrieval. Three approaches are discussed: content-based information retrieval done by computers, social metadata created by end users, and professional description. The author concludes that there are merits and shortcomings of all three, but that they often complement each other.

This textbook gives a great overview of the complicated issues that affect information resource description today. Readers will need to do more research if they want to get deeper into any specific standard or schema.—*Hilary L. Robbeloth (hrobbeloth@pugetsound.edu), University of Puget Sound, Tacoma, Washington*

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Marketing Your Library's Electronic Resources: A How-To-Do-It Manual for Librarians. By Marie R. Kennedy and Cheryl LaGuardia. Chicago: Neal-Schuman, an imprint of the American Library Association, 2013. 177p. \$60 softcover (ISBN: 978-1-55570-889-4). How-To-Do-It Manuals.

Marie Kennedy and Cheryl LaGuardia seek to fill a gap in the library literature by collaborating on a guide that is unique in its focus. Not only does it combine the critical topics of electronic resource management and library marketing, it addresses the need and the know-how for developing a marketing plan. The authors preface the book with their reasons for writing it, including limited patron awareness of electronic resources, a lack of librarian familiarity with marketing techniques, and a need to justify the value of library services and collections in the face of market competition and a tight economy. LaGuardia has written and reviewed widely on the subject of electronic resources, while Kennedy has lectured on and researched e-resources from a marketing perspective. Although both authors draw their experience from academic libraries, this book targets all library types and personnel, reflecting the belief that the most effective marketing occurs in the daily interactions of library staff with user communities.

The manual is divided into two parts. Part 1 describes the step-by-step process of developing a marketing plan. The first chapter establishes the purpose of the plan, while subsequent chapters deal with design, implementation, writing, assessment, and revision. Part 2 provides sample marketing reports from a digital library, an academic library, and two public libraries. The "Web Extra" feature of the book offers access to PDF and editable Microsoft Word versions of these reports.

Each chapter is well documented with cited references and recommended resources. In chapter 1,

for example, coverage of Counting Online Usage of Networked Electronic Resources (COUNTER) includes the website for its Code of Practice. Chapter 2 points to such web tools as Strength, Weaknesses, Opportunities, and Threats (SWOT) templates for strategic planning and Gantt chart software for managing timelines. All URLs that I accessed were current as of this writing.

True to their marketing theme, Kennedy and LaGuardia introduce key concepts with analogies to everyday life and popular culture. In chapter 1, they compare marketing without a plan to shopping without a list, with a reminder that the first part of making a list is taking stock of what you have. This strategy helps to illustrate and reinforce ideas in a user-friendly style. The how-to of e-resource marketing is outlined in chapter 2 with the design of a nine-step plan. Chapter 3, "Implement Your Marketing Plan," shifts the focus to actual practice. I found the title somewhat misleading; this chapter is essentially a literature review, organized within the context of the authors' nine-step framework. In a recent article, Kennedy asserts that there is not yet a strong-enough body of literature to identify a clear "path for success in marketing electronic resources."¹ For quick reference, the authors distill information into figures and tables, including a visual outline of the planning process in figure 2.1 and a summary of three key studies in table 3.2 that resulted in "actionable knowledge" (65). A useful sidebar of professional journals and databases encourages readers to stay current with marketing research.

The authors provide tips in chapter 4 on putting the plan into writing. They highlight what they feel are the strongest components of the examples offered in part 2—a move toward suggesting best practices. This chapter might have been better placed as an introduction to part 2 to segue to the written reports, which vary from short

and to-the-point to more detailed and comprehensive. I found three of the four plans to be helpful as potential models. Example 3 has a broader scope and perhaps is not as useful to those looking specifically for an e-resource marketing plan.

Knowing that real-world constraints will likely alter the course of any plan, Kennedy and LaGuardia address the need for constant assessment and revision in chapters 5 and 6. Documenting outcomes helps to improve future endeavors, not only for individual libraries, but for the profession as a whole. The authors allay the fears of math-phobic librarians by providing sample questions, feedback forms, and an assessment rubric. Also included are appropriate discussions about the role of a well-designed library website and ethical considerations regarding marketing style.

Kennedy and LaGuardia offer a flexible, step-by-step approach to e-resource marketing that is neatly laid out in the table of contents and searchable via a comprehensive index. The variety of presentation techniques—narrative text, sidebars, figures and tables, and "Web Extras"—makes this a multilayered resource appropriate for a wide range of learning styles, institutional environments, and levels of marketing experience. If the authors' emphasis on planning and assessment is heeded by librarians, perhaps a future edition of this guide will be able to cite a richer literature that includes evidence-based best practices.—Lynn Schuessler (lynnschuessler@comcast.net), York, Pennsylvania

Reference

1. Marie Kennedy, "Collaborative Marketing for Electronic Resources: A Project Report and Discussion," *Collaborative Librarianship* 5, no. 1 (2013): 42–51, accessed July 8, 2013, <http://collaborativelibrarianship.org/index.php/jocl/article/view/204/182>.