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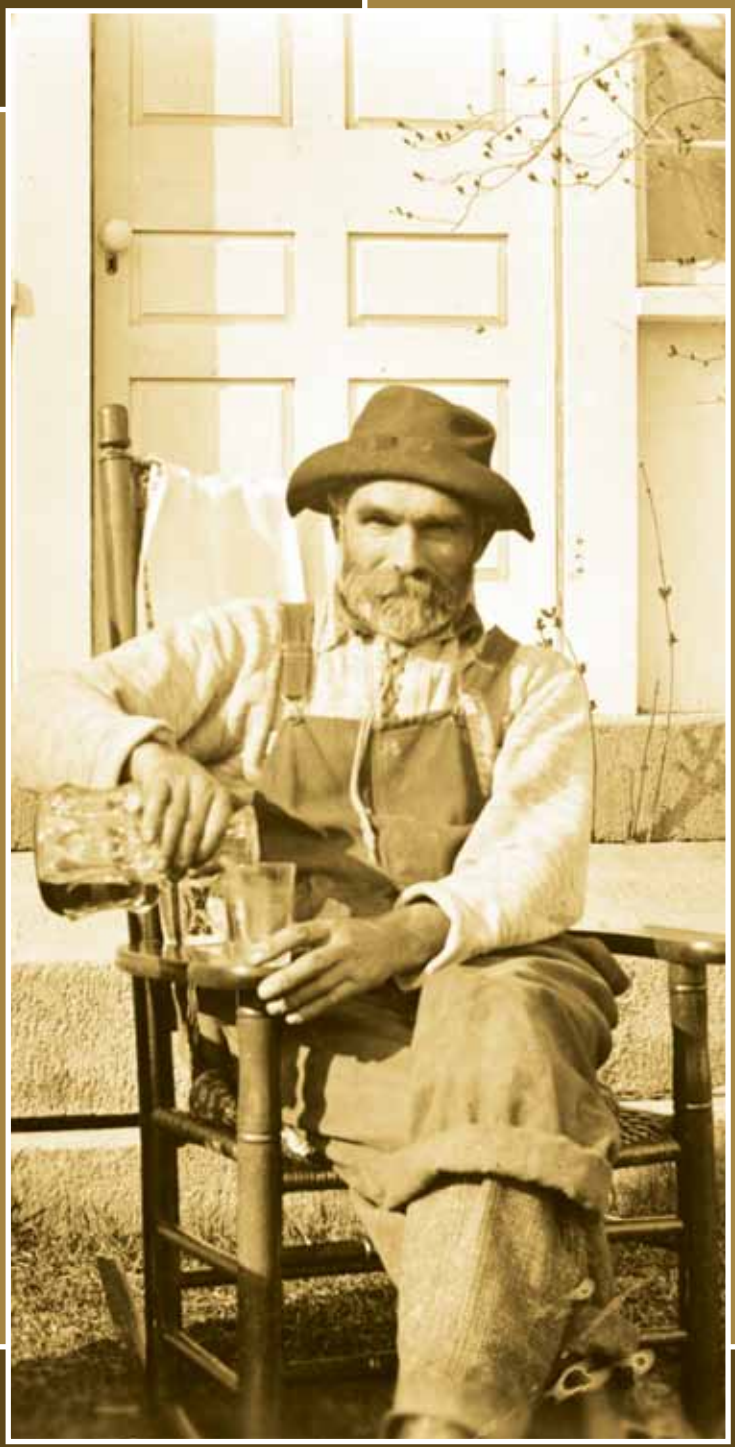

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Year of Cataloging Research

Guest Editorial

Cataloging Research Guided by Values

Allyson Carlyle

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Last fall, I taught a course on history and foundations of libraries and librarianship. During the course, we read Gorman's *Our Enduring Values: Librarianship in the 21st Century*.[1] We had lively discussions about the definitions of each value and how each interacts with the challenges libraries are currently facing. When asked to write an editorial about the Year of Cataloging Research, I did not plan on framing a discussion of research in the context of values. However, teaching the course has placed the concept of values in the forefront of much of my thinking lately, and it seems timely and highly appropriate to bring values to the research conversation. How better to answer the question "What kind of research should we be doing?" than to first consider it in the light of the values we see as critical to sustaining our libraries and our profession?

Librarians have believed for many years that the provision of access to library materials through high-quality cataloging supports the fundamental values of the profession. To begin, I introduce values identified by Gorman, with examples of how the library practice of bibliographic description—full-level cataloging and classification—has buttressed each of them.

Stewardship of the World's Knowledge

The professional practice and international standards apparatus of cataloging supports stewardship by giving us detailed information about what we have and, for some collections, what condition it is in. Many of us provide detailed information for collection materials in part to let the world know what we have so as to not waste money buying duplicates; in other words, high-quality bibliographic descriptions facilitate wise expenditures of scarce resources. These descriptions help us make decisions about what to weed and what to keep. They help us make decisions collectively about which libraries will take on the responsibility of ensuring that copies of important materials are preserved, how many copies should be retained, and where they should be housed. Cataloging records may be used to keep track of which materials need preservation, and when they need attention.

Service to the World's Communities

High-quality cataloging records make it possible for our local users as well as users throughout the world to find and gain access to the library materials they

need. They make it possible for reference librarians to mediate user queries. They help interlibrary loan librarians find the exact items sought by scholars, students, and users from other libraries. High-quality cataloging records save the time of the user (Ranganathan's fourth law) by making it easy to determine whether a library has a specific edition of a work.[2] The assignment of class numbers makes browsing and discovery of library materials possible both online and in person. Through maintenance of collective cataloging databases, we share our work so that libraries all over the world do not have to waste time and money describing the same items according to the same standards over and over again.

Equity of Access

Cataloging standards such as the Anglo-American Cataloguing Rules and the Library of Congress Subject Headings (LCSH) have the potential to assist all users in finding materials that will be useful to them. Some may argue, justifiably, that standards such as these may also get in the way of large groups of users (children, minorities, non-English speakers, nonspecialists) gaining access to the materials they need. However, with sufficient flexibility by those who create these standards and effort by catalogers, cataloging standards could most certainly be made more accommodating of the needs of disparate user groups. We want to make sure that all library users are led to all the items that they need. To paraphrase Ranganathan, to all users the resources they need; to all resources the users who need them.

Literacy and Learning

People do not often recognize that the two primary classification schemes in use in the world, Dewey Decimal Classification and Library of Congress Classification, organize materials through positioning them in a disciplinary context. Organization of library materials on the basis of academic discipline directly supports the educational missions of many libraries. Classification provides shelf arrangements, physical and virtual, that facilitate users' abilities to educate themselves in a particular area or on a particular topic. The syndetic structure provided in tools such as LCSH facilitates movement through hierarchically arranged terminology. As a children's reference librarian at one point in my career, I used this structure to help children and their parents learn more about the area they were investigating. If implemented creatively and intelligently, the syndetic structures of our controlled vocabularies can provide fun and exciting ways to

navigate the world's knowledge. To put it somewhat differently, they can teach as well as provide access.

Democracy

Democracy thrives in an atmosphere of open discussion and informed decision-making. Librarians in public libraries aim to support these democratic ideals by creating collections that reflect multiple viewpoints. Collections are maintained and expanded intelligently and effectively by knowing what we have. Information can often be derived directly by mapping library holdings using the disciplinary context provided by class numbers. "Undercataloging" is a term used by Berman to describe minimal (and other less than full) cataloging.[3] When we decide to catalog segments of our collections less fully than other segments, we should be fully aware that we are making value judgments. These judgments may privilege one type of material over another, leaving users without access to the materials they need for decision-making and engaged civic involvement.

Conclusion

Although research cannot support our values in and of itself, our values can and should inform and guide our research. The quality of access we give to our materials through bibliographic descriptions has—or so we have believed, as evidenced by the examples above—an enormous impact on how effectively we are supporting those values. This belief is being challenged more strenuously with each passing year. Precious resources are at stake, and research can provide data we need to guide decision-making processes in libraries. This is, I believe, one of the reasons the Library of Congress Task Force on the Future of Bibliographic Control devoted an entire section of *On the Record* to recommendations for evaluation and research.[4]

Unfortunately, the kind of research that is needed to support the critical decisions we are facing is extremely difficult to design and carry out. For instance, how do we determine the effectiveness of full-level cataloging versus more basic level cataloging? Although research projects have attempted to answer this question, they have been poorly designed and executed, and the results themselves poorly communicated. We know how much the Library of Congress spends on individual elements of description, but we do not have a method of determining whether the money spent for each of those elements is worthwhile. We do not know, for instance, whether some elements are more critical for the description of some types of materials than others. We do not know whether some elements are more critical to certain groups of users than others. We do not know how much each element contributes to the searching, selecting, and use of library materials. We do not know the impact of users *not* finding what they need because of inadequate cataloging records. Although planning and implementing research on these topics would be very challenging, we must find ways to do it if we take our responsibilities to our users and our collections seriously.

Research can help guide us in a time when priorities seem not only to be unclear but also to be in conflict with each other. Librarians always have had to make difficult and critical decisions. It is up to all of us to make sure the data we need to make these critical decisions is informed by research that is well designed, well executed, and reported clearly and without bias or agenda.

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Erratum

"Google Books as a General Research Collection," by Edgar Jones, in the April 2010 issue contains an error on page 85. The sample should be 398 titles in Figure 1 and 300 in Figure 2. The editor apologizes for the error.

Year of Cataloging Research

The Evolving Role of the Metadata Librarian

Competencies Found in Job Descriptions

By Myung-Ja Han and Patricia Hswe

Metadata librarian positions have been increasing in academic and research libraries in the last decade, paralleling the expanded provision of, and thus description of and access to, digital resources. Library literature has only begun to explore the significance and implications of this new, still evolving role. In the context of a twenty-first-century academic library, what knowledge and experience should a metadata librarian have? How different is the job of a metadata librarian from the job of a cataloging librarian? One way to determine the kinds of qualifications and skills being sought is to consult job postings for metadata librarians. The authors examined job descriptions dating from 2000 through 2008 that were featured in advertisements for both metadata librarians and cataloging librarians, to determine where these two roles converge and diverge, and what these commonalities and differences convey about the role of metadata librarians today.

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The roles and responsibilities of cataloging librarians have evolved alongside changes to both cataloging systems and the resources to which libraries provide access. The appearance of the title "metadata librarian," beginning in the late 1990s, reflects the changing role of cataloging librarians as well as a shift in library resources and technology (e.g., developments in digital library initiatives and information technology (IT) with a concurrent increase in the provision of digital resources).[1] While metadata is often defined broadly as "data about data," librarians generally mean descriptive metadata that facilitate discovery and access.[2] Thus Machine-Readable Cataloging (MARC) format records are technically metadata. However, librarians continue to use the term "metadata" to refer to non-MARC descriptive metadata encompassing a variety of standards, schema, and so on. Perhaps because of this ambiguity, the responsibilities and competencies of metadata librarians have yet to be clearly defined, and job descriptions can vary markedly in terms of the requirements and preferred qualifications listed.

The purpose of this study was to determine the competencies of metadata librarians in comparison with those of cataloging librarians. The authors sought to answer the following research questions:

1. What is the required skill set for a metadata librarian?
2. Has the skill set changed over time, specifically from 2000 through 2008?
3. Has the organizational home for metadata librarians changed over time?
4. What are the differences between metadata librarians and cataloging librarians in terms of competencies and qualifications?

Literature Review

To date, metadata librarian roles and responsibilities have not been discussed extensively in library literature compared to the attention given cataloging librarian roles and responsibilities. Research on cataloging librarian job descriptions, based on surveys and empirical studies, tends to focus on how differences in resource formats and developments in IT have affected the roles and responsibilities of cataloging librarians.

Twelve years ago, Buttlar and Garcha surveyed 271 catalogers to see how automation and technological innovations had changed the profession.[3] They found that automation had shifted cataloging duties to nonprofessionals as catalogers participated more in bibliographic instruction and database maintenance or upgrading, and acquired more management responsibilities. Chaudhry and Komathi analyzed descriptions of cataloging librarian jobs posted in 1990 through 1999.[4] The authors divided the descriptions into two periods to consider the effect of technological developments on job qualifications. They determined that job descriptions dating from 1990 through 1994 belonged to the "traditional environment," while those dating from 1995 through 1999 fell into the "electronic environment."[5] In their analysis, the majority of cataloging librarian jobs in the electronic environment called for a "knowledge of automated cataloguing systems," signaling a "dependency of cataloguing on technology and the importance of technology related skills and knowledge on this profession."[6]

Kwasik addressed the relationship between technological progress, exemplified by increasing volume of electronic resources, and job qualifications for librarians specializing in serials cataloging.[7] According to Kwasik, serials librarians should know how to catalog both print and electronic resources and should receive training in markup languages, Dublin Core (DC), and management skills. A new title for this kind of cataloger, "serials/electronic resources cataloger," emerged in 2001 and appeared in 46 percent of the serials librarian job descriptions Kwasik analyzed. Khurshid also reported on technical developments and their effect on required job qualifications for cataloging librarians.[8] Analyzing 151 job descriptions gathered in 2000–2001, Khurshid noted that libraries were interested not only in previous cataloging experience but also in knowledge of emerging metadata schemes and tools. The word "metadata" appeared in six job titles during this period. Khurshid found that developments in IT had affected everything from position titles to the required skills of catalogers.

Hall-Ellis reviewed qualifications for cataloging librarians from the perspective of library school education.[9] In her empirical study, based on 266 job descriptions posted from 2000 through 2005, she compared descriptions of job requirements and expectations to descriptions of programs in library and information science (LIS), especially in the context of cataloging courses. She argued that a course in introductory cataloging is not enough for students aspiring to be professional catalogers because cataloging librarians increasingly are expected to know metadata schemas and to have technical and computing skills.

The study carried out by Park and Lu focused on the qualifications of metadata professionals (not specifically of librarians) working mostly with resources in digital and electronic formats.[10] They analyzed the descriptions of jobs, dating from 2003 to 2006, that had titles with the words "metadata, electronic, e-resources, and digital."[11] They discovered that while conventional cataloging tasks and procedures continued to apply and were combined with metadata creation activities, metadata professionals also were required "to be able to adapt to a changing environment and keep abreast of emerging technologies and metadata standards."[12]

The literature on metadata librarian roles suggests that the position of metadata librarian has evolved from that of cataloging librarian. According to Faiks and McCue, metadata librarians first appeared as additions to the cataloging profession. They stated that "open positions give the library the opportunity to completely recast a position."[13] At Cornell University Library, for example, a metadata librarian position was created in 1997 to reflect the "broader scope of the cataloging staff."[14] Calhoun defined a metadata librarian as someone at the intersection of many services in a library (e.g., technical services, information technology, collection management, and digital library and access). She stated that this juncture of services has occurred because "metadata is key to empowering information seekers and to building scholarly information access systems that are easy to use."[15]

Beacom noted that metadata librarians are needed because of the increasing amount of digital resources and the growing expectation for integrated access to these resources.[16] Chapman further defined the role of the metadata librarian.[17] His research focused on metadata librarians affiliated with a technical services division, which traditionally has been responsible for the description of resources. He described four key functions of metadata librarians—collaboration, research, education, and development, which together complement Calhoun's definition of metadata librarians' roles.

A final resource consulted for the literature review was the SPEC Kit *Metadata* published in 2007 by the Association of Research Libraries (ARL).[18] The SPEC survey looked into ARL libraries' implementation of metadata, exploring a range of topics, such as metadata standards, creation, management, and challenges as well as staffing and training issues. Like the current paper, the SPEC Kit on metadata explored questions of organizational change and metadata librarian requirements and qualifications. The survey results included several interesting findings. For example, MARC

was still the most frequently used metadata standard in ARL member libraries and continued to be required knowledge for metadata librarians. In addition, more than half of the responding libraries used Library of Congress Subject Heading (LCSH), the Library of Congress name authority file, and the Art and Architecture Thesaurus, affirming the importance of traditional cataloging knowledge for metadata work. The survey also found that 85 percent (55) of responding libraries had undergone organizational changes, and 62 percent (36) of libraries had refined responsibilities for existing positions to meet the need to carry out metadata work.

The literature on the work of cataloging librarians underscored how automated systems and increasing variation in resource formats have shifted the emphasis from actual cataloging duties to knowledge of emerging technologies and metadata schemas as well as to changing responsibilities, such as management tasks. This development arguably anticipated the pronouncement made by Faiks and McCue that the metadata librarian position arose in the late 1990s largely to broaden the scope of cataloging staff.[19] The literature on metadata librarian positions confirmed this observation by repeated mention of the need for metadata librarians to collaborate across library units and to keep current with technology through research and professional development. The ARL SPEC Kit on metadata offered a comprehensive view of the metadata librarian position and its context. Yet by reviewing job postings for metadata librarian *and* cataloging librarian positions, the authors of the present paper were interested in analyzing the evolution of the metadata librarian position in the context of any similarities to, and differences from, the cataloging librarian position. Until now, these two types of librarians have not been compared. The authors have pursued a comparative approach, not only because the cataloging librarian may be seen as a prominent precursor to metadata librarian roles and responsibilities but also to try to see, more than a decade after Faiks and McCue's pronouncement, whether distinctions between the work that each type of librarian does can be discerned—and if they can, then what are they? If no true distinctions can be detected, then what might this suggest about strategizing for information access and technical services units in libraries in the future?

Research Method

The authors' first step was to define the criteria for including positions in this study. All the position descriptions that had job titles with the word "metadata" in them, such as "metadata librarian" and "metadata and digital collections librarian," were considered within the scope of this project. When the title included both "metadata" and "cataloging" or "catalog," it was also considered a metadata librarian position. With these criteria in mind, 86 job descriptions were collected, dating from January 2000 through December 2008, from three different sources: *American Libraries*, *College and Research Libraries News*, and online sources, such as the Metadata Librarians ListServ (http://metadatalibrarians.monarchos.com) and Explore Careers (www.lis.illinois.edu/careers/studentsalumni/jobs/explore), an electronic bulletin board managed by the Graduate School of Library and Information Science at the University of Illinois at Urbana-Champaign. Explore Careers aggregates job postings found via library-related electronic discussion lists (e.g., American Library Job Bulletin, Metadata Librarians ListServ, and Autocat). The authors selected 2000 as the starting point for analyzing the job descriptions because the metadata librarian position is being considered in the context of a twenty-first-century academic library. The stopping point was the end of 2008 (although the authors note that no openings for metadata librarian positions were advertised from October through December 2008).

On the basis of content from the job descriptions, the authors created the following categories in a Microsoft Excel spreadsheet, with relevant data from the descriptions entered for each field: job title, institution name, institution type, year of job posting, required qualifications, and desired qualifications. In this process, all the duplicated job postings were removed from the data set. Information about the placement of the metadata librarian in the organizational structure of the institution also was recorded in the spreadsheet. Qualifications, both required and desired (also phrased in some descriptions as "preferred"), were then subdivided into three categories: education; professional skill set (generally encompassing knowledge of metadata standards and bibliographic tools); work-performance skills, such as communication skills and management skills; and knowledge of IT. These qualifications were analyzed to gain a sense of competencies required or desired in metadata librarians.

In addition, the authors reviewed descriptions for 85 cataloging librarian positions for comparison with metadata librarian jobs. The 85 positions were advertised during the same period (January 2000 to December 2008) and retrieved from two print sources, *American Libraries* and *College and Research Libraries News*.[20] These descriptions were entered in an Excel spreadsheet and organized in categories identical to those for the metadata librarian job descriptions. This approach was taken to track and compare changes over time, both in number of jobs and in qualifications for metadata librarians and cataloging librarians.

Findings and Analysis

Demographic Data

The number of metadata librarian jobs posted each year did not significantly change until 2007. In 2007, 24 jobs were posted compared to 10 jobs in 2006. The number of jobs posted in 2008 fell to 19. As mentioned above, no

metadata librarian job openings were posted from October to December 2008. However, the 2008 figure of 19 is still the second largest number of jobs in the time span (see table 1). By contrast, the number of cataloging librarian jobs posted in the same period showed a decreasing trend. Nineteen cataloging jobs were advertised in both 2000 and 2001, but the number decreased to three in 2007 and four in 2008.

The number of postings for metadata librarian jobs and cataloging librarian jobs reveals contrasting trends, one increasing (metadata librarians) and the other decreasing (cataloging librarians). This divergence invites speculation that the title "metadata librarian" may be replacing the title "cataloging librarian." This result was also confirmed in Ma's survey findings.[21] The extent to which the work of metadata librarians differs from that of cataloging librarians has not been studied. Whether one position is replacing the other needs to be confirmed by future studies such as a survey of libraries that hire metadata librarians.

The 86 metadata librarian jobs were posted by 66 organizations, with 12 institutions posting more than one job advertisement (6 institutions posted two, 5 institutions posted three, and 1 institution posted four). To see what kinds of institutions were seeking metadata librarians, the authors categorized the institutions by type. As shown in table 2, 55 of 66 institutions (83.3 percent) were academic libraries. Among them, 31 institutions were large university libraries and member libraries of the ARL. The 12 institutions that posted more than one advertisement for a metadata librarian job were all large university libraries. There were 19 mid-size university libraries, 5 four-year academic libraries, 4 government agencies, 3 public libraries, 2 commercial sectors, and 2 nonprofit agencies. The 85 cataloging librarian job descriptions were posted by 65 institutions. Among these institutions, 63 (96.9 percent) were academic libraries, and 23 of those were large university libraries (members of the ARL), 36 were mid-size university libraries, and 6 were four-year academic libraries.

Table 1. Number of Jobs Posted per Year

Year	Metadata Librarian	Cataloging Librarian
2000	5	19
2001	6	19
2002	7	10
2003	5	8
2004	2	10
2005	8	5
2006	10	7
2007	24	3
2008	19	4
Total	86	85

Table 2. Postings by Institution Type

Institution Type	Metadata Librarian	Cataloging Librarian
Large academic university library	31	23
Mid-size university library	19	34
4-year college library	5	6
Government agency	4	1
Public library	3	-
Commercial sector	2	-
Nonprofit agency	2	1
Total	66	65

A total of 56 of 86 metadata librarian job descriptions stated where the position resided in the institution's organizational structure (see table 3). Of these, 40 descriptions (71.4 percent) were for positions affiliated with the cataloging unit in a technical services division. However, beginning in 2004, the names of other library units surfaced in these descriptions. Four job descriptions referred to a digital library unit while others referenced a scholarly resources integration department, library computing and media services, information acquisition and management, data systems group, metadata and systems development, and archives (each appearing in an individual job posting once). During this same period cataloging units at several institutions underwent a name change. In 2007 and 2008, five academic libraries posted job descriptions that mentioned a cataloging and metadata unit rather than a traditional cataloging unit.

Of the 85 cataloging librarian job postings, 53 explicitly mentioned where the position belonged. Among these 53 descriptions, 50 (94.3 percent) said the positions were in a cataloging unit in a technical services division. In 2002, two job descriptions stated that the cataloging librarian would work in a unit other than a strictly cataloging unit: one for a cataloging and metadata unit and one for a digital project and metadata unit. Also, in 2007, one description said the cataloging librarian worked in the learning resources and technology services division instead of the technical services division.

These data suggest that libraries have been responding to changes in resource format, delivery, and access by creating new service units, which is reflected not only in the creation of, or variation in, job titles but also in the changes to a library's organizational structure.

Table 3. Organizational Affiliation of Metadata Positions

Affiliation	2000	2001	2002	2003	2004	2005	2006	2007	2008	Total
Technical services division	2	4	2	2	1	5	5	10	9	40
Digital library unit					1			1	2	4
Archives								1		1
Scholarly resources integration department								1		1
Library computing and media services									1	1
Information acquisition and management								1		1
Data systems group									1	1
Metadata and systems development									1	1
Technical services division/cataloging and metadata service								3	2	5

Job titles also can reflect changes in the profession. Among the 86 job descriptions analyzed, 21 different titles were found that included "metadata" (see table 4). Among these, eight titles (38.1 percent) were newly used since 2007. The most frequent job title was "metadata librarian," appearing in 48 (55.8 percent) job descriptions. An additional 13 descriptions (15.1 percent) had the title "metadata and cataloging librarian" (or, similarly, "cataloging and metadata librarian"). Of the 48 metadata librarian positions, 29 (60.4 percent) were posted from 2006 to 2008, and of the metadata and cataloging librarian positions, 12 (98.3 percent) were posted since 2005.

Five job titles (5.8 percent) had the word "digital" in addition to "metadata" (digital resources metadata librarian, metadata and digital services librarian, metadata and digital collection librarian, metadata and digital initiatives developer, and coordinator for digital library and metadata services). The use of "metadata" in other job titles (metadata serials specialist, emerging technology and metadata librarian, multimedia and e-monographs catalog and metadata librarian, metadata archivist, GIS (geographic information system) metadata librarian, and music cataloger/metadata librarian) suggests the growing importance and awareness of metadata in library work. The range of job titles for doing metadata work, which was described in similar ways in the postings, also imparts succinctly how the need to address metadata issues cuts across library units.

Also notable is the number of job titles that included words such as "coordinator" and "service." Seven of 21 metadata job titles included one or both of these words in the title of the position. Several articles in the literature review discussed how the responsibilities of metadata and cataloging librarians have altered over time.[22] These studies found that the most prominent change in the responsibilities of cataloging librarians is the shift from creating original cataloging records to coordinating the cataloging and metadata work of the institution, as reflected in the new titles for the position of metadata librarian.

Qualifications

Of the 86 metadata librarian job descriptions, 76 listed required qualifications, and 58 listed desired qualifications. For the cataloging librarian job descriptions, 80 of 85 included required qualifications, and 56 included desired qualifications. The authors analyzed qualifications, both required and desired, to see what kind of skill set and educational background were necessary in applicants, since these qualifications can serve as a barometer for changes in job responsibilities.

Required Qualifications

Most institutions advertising openings for metadata librarians required a master's degree from a library school. A total of 70 (91.1 percent) of the 76 descriptions that listed required qualifications expected candidates to have a master's degree from an accredited library school. Of these 70 descriptions, 10 specifically mentioned "either Master of Information Science or Master of Library Science degree." This variation could indicate curriculum changes occurring in library schools. By 1980, 23 graduate programs (33.8 percent) were titled "Library and Information Science." By 1983, 37 programs (54.4 percent) had been named or renamed "Library and Information Science."[23] Voos's article suggested that changes in the names of accredited library school programs reflect the influence of the "information concept" on the "library concept."[24]

IT and its implications in the library domain also can be factors in library and information science education requirements.[25] In 15 metadata librarian job descriptions that mentioned the master's from a library school or an equivalent

Table 4. Job Titles

Job Title	2000	2001	2002	2003	2004	2005	2006	2007	2008	Total
Metadata librarian	3	5	3	3	2	3	7	11	11	48
Metadata/cataloging librarian	1					4		4	4	13
Metadata coordinator	1									1
Metadata/serials specialist		1	1							2
Metadata indexer			1					1		2
Cataloging/metadata services librarian			1							1
Coordinator of cataloging /metadata			1					1		2
Metadata archivist /librarian				1						1
Metadata /digital initiatives developer				1						1
Digital resources /metadata librarian						1				1
Music cataloger/metadata librarian							1			1
GIS/metadata librarian							1			1
Metadata services librarian							1	1		2
Multimedia/e-monographs catalog/metadata librarian								1		1
Data librarian/metadata specialist								1		1
Coordinator of metadata services								1		1
Coordinator for digital library/metadata services								1		1
Catalog maintenance/metadata librarian								1		1
Metadata/digital services librarian								1	1	2
Metadata/digital collection librarian									2	2
Emerging technologies/metadata librarian									1	1
Total	5	6	7	5	2	8	10	24	19	86

advanced degree as a requirement, 8 institutions listed computer science as a possible prerequisite area of study. In 2008, 3 institutions listed a bachelor's degree in "related areas" as the educational requirement for job descriptions posted.

Among 80 job descriptions for cataloging librarian positions that had required qualifications, 76 listed education as a part of the required qualifications. All of the 76 descriptions for cataloging librarian positions stated that the candidate should have a master's from a library school or an equivalent degree. For a cataloging librarian position, experience in cataloging (usually one to three years) was an additional requirement. This finding confirmed that of Khurshid, who reported that previous work experience was one of the job requirements for catalogers.[26]

Metadata-related knowledge and experience with metadata schemes, trends, and emerging standards are the most frequently listed qualifications for metadata librarians. These were found in 76 descriptions (81.6 percent). In addition, 48 metadata librarian job descriptions (63.2 percent) listed cataloging experience and knowledge of cataloging standards as required qualifications.

For cataloging and metadata standards that are listed in these required qualifications, MARC and DC are the two most frequently cited cataloging and metadata standards that metadata librarians were required to know; 37 descriptions listed MARC and 36 listed DC (see appendix A). The number of descriptions that listed MARC as required knowledge increased each year, from a single job in 2000 to 11 in 2008. Knowledge of the *Anglo-American Cataloguing Rules*, 2nd ed. (*AACR2*) was a requirement in 25 descriptions; 20 descriptions cited knowledge of the Library of Congress Classification (LCC) as a requirement. Other metadata standards mentioned included Encoded

Table 5. Positions Requiring Knowledge of OCLC and ILS

	2000	2001	2002	2003	2004	2005	2006	2007	2008	Total
Cataloging Librarian										
ILS	9	13	7	6	5	4	5	1		50
OCLC	13	6	4	6	6	3	3			41
Metadata Librarian										
ILS			2			2		6	8	18
OCLC						3		4	5	12

Archival Description (EAD), which appeared in 22 descriptions; Metadata Object Description Schema (MODS) and Metadata Encoding Transmission Standard (METS), which appeared in 18 descriptions; and Visual Resource Association (VRA) and Text Encoding Initiative (TEI), which appeared in 16 descriptions.

Knowledge of metadata standards was emphasized less in job descriptions for cataloging librarians (see appendix A). Among 80 cataloging librarian job descriptions that listed required qualifications, 53 descriptions (66.3 percent) identified knowledge of MARC as a requirement. However, only 5 job descriptions (6.3 percent) required knowledge of metadata while other descriptions were more specific about metadata schemes, expecting candidates to know DC (5 descriptions), TEI (2), and EAD (1). Whereas knowledge of metadata standards is not as important in job descriptions for cataloging librarians as for metadata librarians, other qualifications not present in metadata librarian job descriptions were listed as required qualifications for cataloging librarians. These qualifications included knowledge of foreign languages (24 descriptions, or 30 percent), experience in cataloging (35 descriptions, or 43.8 percent), and nonbook cataloging experience (9 descriptions, or 11.3 percent).

While similar qualifications, such as knowledge of cataloging rules and standards (*AACR2*, MARC, LCSH, Library of Congress Rule Interpretations (LCRI), LCC, and authority control) and knowledge of metadata standards (DC, TEI, and EAD), appeared in job descriptions for both metadata librarians and cataloging librarians, comparing the required qualifications revealed differences in the mandatory competencies for these two jobs. For metadata librarian jobs, the list of metadata standards expanded from descriptive metadata schemas (such as MODS, VRA, and FGDC) to other types of metadata schemas (such as METS, which places particular emphasis on structural metadata, and PREMIS, the preservation metadata schema).

Other technical skills related to metadata management, such as experience using the Open Archives Initiatives Protocol for Metadata Harvesting (OAI-PMH), Extensible Markup Language (XML), and Resource Description Framework (RDF), were mentioned mostly in metadata librarian job descriptions (see appendix A). In job descriptions for cataloging librarians, only one description (in a 2003 job posting) mentioned XML. However, knowledge of or experience with Online Computer Library Center (OCLC) Connexion and integrated library systems (ILSs) was required of cataloging librarians more frequently than of metadata librarians (see table 5). Foreign language skills and cataloging experience also were mentioned more often in cataloging librarian job descriptions than in those for metadata librarians. The analysis for professional work skills revealed that metadata librarians are required to know a variety of metadata standards and have a facility for the IT used for metadata sharing, while cataloging librarians need skills that are focused on traditional cataloging and its management.

Descriptions for both metadata librarians and cataloging librarians shared an almost identical list of required work performance skills (see appendix B). These descriptions listed communication skills (written and oral) as the most frequently required qualification. Additional required qualifications common to job descriptions for both metadata librarians and cataloging librarians were the ability to work both in a team environment and independently, interpersonal skills and organizational skills, and flexibility to work in a rapidly changing environment.

The required qualification that was both unique and prominent in descriptions for metadata librarian jobs was the "ability and willingness to learn." The recurring appearance of these criteria in metadata librarian job postings suggests that institutions are seeking people for these positions who are self-motivated and take the initiative to learn new IT skills.

Desired Qualifications

A total of 58 descriptions for metadata librarian positions and 56 descriptions for cataloging librarian positions listed desired qualifications (see appendix C). The two most frequently cited desired qualifications in metadata librarian job postings were experience in cataloging (23 job descriptions, or 39.7 percent) and knowledge of foreign languages (21 job descriptions, or 36.2 percent). As noted above, both of these criteria were listed as required qualifications in job descriptions for cataloging librarians. More skills related to digital library development and technology, such as digital management software, XML, and OAI-PMH, have

appeared since 2003 as desired qualifications for metadata librarians. Knowledge of copyright law also has been included since 2006.

Knowledge of metadata standards appeared more often as a desired qualification (12 descriptions, or 21.4 percent) than as a required qualification for cataloging librarian jobs. Knowledge of foreign languages and experience in cataloging were the two most desired qualifications (29 descriptions or 51.8 percent) in cataloging librarian positions; the same number listed them as required. In addition, 28 job descriptions (50 percent) listed knowledge of LIS, and 15 descriptions (26.8 percent) listed knowledge of OCLC Connexion as desired qualifications. The appearance of subject expertise and a second master's degree as desired qualifications in cataloging librarian job descriptions may relate to the concept of subject specialization in original cataloging. Digital library skills and technology-related skills also appeared in desired qualifications. These included IT skills, digital collection experience, database maintenance skills, and knowledge of innovative user interface design. Knowledge of XML/SGML (standard generalized markup language) appeared once in 2000 as a desired qualification.

Discussion

The method undertaken in this investigation was highly quantitative. It confirmed some expectations (e.g., that metadata librarians need to have broader knowledge of metadata standards, markup languages, and technology skills related to metadata management than do cataloging librarians) and yielded some surprises (e.g., that the top two desired qualifications for metadata librarians and cataloging librarians are identical: foreign language knowledge and cataloging experience). The facts resulting from the foregoing analysis tell only part of the story, however—to some extent because of an oversight in the method. While print and online job sources were consulted for the metadata librarian positions, only print sources were referenced for the cataloging librarian jobs. In retrospect, for the sake of consistency in approach, descriptions for cataloging librarian positions should have been sought in online job listings as well, and the authors plan to rectify this oversight in future research. The authors also would reconsider what is actually meant by a job title, since there likely are librarians doing work with metadata, both part-time or full-time, that do not hold the title of metadata librarian or that do not include the word "metadata" in their titles, as revealed in the review of job postings. Recently, some examples of such positions include digital archivist and digital curator, jobs to which attention to metadata-related issues is integral. In addition, this study would have benefited from a comprehensive survey of metadata librarians, and the librarians with whom they collaborate regularly, to seek details about their actual responsibilities. The reason for surveying other librarians is that metadata librarianship is often collaborative in nature, involving interaction with more than one library unit, and a broadened investigation would have potential for a more complete portrait of the work in which metadata librarians are engaged.

The authors also plan to introduce a qualitative component to the research. A subset of librarians from those surveyed will be chosen for follow-up, semistructured interviews. Using these interviews, the study could include profiles of two or three metadata librarians, thereby providing additional insight into the substance of their work. Data gathered from a qualitative approach would enable a comparison of the findings that resulted from the job description analysis, the survey, and the interviews and profiles. Questions such as the following could be addressed: Which responsibilities mentioned in the job descriptions are under the purview of a practicing metadata librarian, and which are not? What are metadata librarians doing that could be shared with current library students to better prepare them for such jobs? Is the metadata librarian position a forerunner of other kinds of new and necessary librarian roles, and what might these be?

Finally, since these are early days for metadata librarians, a longitudinal study is in order. In such an approach, a selection of metadata librarians and their libraries could be tracked during an extended period of time to see what kinds of changes—including, but not limited to, the area of digital collection management and access to digital resources—are occurring in libraries as a result of retaining metadata librarians. Thus, a longitudinal investigation would afford a fuller picture than the present study.

Conclusion

This paper set out to explore a set of interrelated research questions about the role and responsibilities of metadata librarians:

1. What is the required skill set for a metadata librarian?
2. Has the skill set changed over time, specifically from 2000 through 2008?
3. Has the organizational home for metadata librarians changed over time?
4. What are the differences between metadata librarians and cataloging librarians in terms of competencies and qualifications?

The survey of job descriptions, posted over a nine-year period, showed that the required skill set for a metadata librarian consists of work-related professional skills, such

as knowledge of metadata standards (including MARC and authority control), work performance skills (such as analytical, communication, interpersonal, organizational, and problem-solving), and the ability to work both in a team environment and independently. The most important work performance skills to have were flexibility in work and the ability and willingness to learn new skills. In terms of IT, metadata librarians were required or desired to be proficient in XML, OAI-PMH, and RDF, which are used for metadata conversion and sharing.

With regard to the second research question, the metadata librarian skill set changed considerably during this period. In 2000 only 1 of 5 job descriptions (20 percent) mentioned communication skills as a requirement. By 2008 that number had increased to 12 (63 percent) of 19 positions advertised that year. The communication skills requirement is in keeping with the collaborative nature of metadata librarian positions. In particular, between the years 2005 and 2008, the job descriptions surveyed showed a steady demand for interpersonal skills, the ability and willingness to learn new skills, the ability to work in a team environment, and competence in digital project management. From 2007 forward, the ability and willingness to learn became the most desired skill for metadata librarians. However, the requirements of work-related professional skills and knowledge of IT did not change. These skills appeared in job descriptions consistently from 2000 through 2008, implying that institutions expect metadata librarians to be able to tackle different metadata standards, including MARC, and also would like them to have knowledge of IT to help to expand access to digital resources.

On the question of placement within a library's organizational structure, this changed little for metadata librarians between 2000 and 2004. For the most part, during this period metadata librarians continued to be based within a cataloging unit. Starting in 2004, however, the job descriptions for metadata librarians began mentioning affiliations with other types of library units, such as a digital library unit, library computing and media services, and information acquisition and management. Also, several institutions changed the names of cataloging units (e.g., to "Cataloging and Metadata Unit"). The placement of metadata librarians in these emerging variations of the cataloging unit, as well as in new library departments and units, suggests that the metadata librarian position has originated in response to changes in the way libraries are delivering and providing access to their collections, confirming reports in the literature reviewed earlier in this paper. New departments and new positions can be interpreted as a revision of library infrastructure, showing a library in a state of transition.

Finally, on the matter of differences between metadata librarians and cataloging librarians, some disparities exist in the competencies and qualifications gleaned from the job description data, but there also were similarities. For example, in 2000, 1 description for a metadata librarian job (of the five jobs advertised that year) called for experience with or knowledge of MARC. By 2008, 11 of the 19 metadata librarian job descriptions posted mentioned knowledge of MARC as a requirement. This statistic matches exactly the descriptions for cataloging librarian positions in 2000. That year, 11 of 19 job postings for cataloging librarians required experience with or a knowledge of MARC. The authors posit that knowledge of or experience with MARC is viewed as desirable for a metadata librarian to have because it is foundational for understanding how metadata standards function in a library environment.

Judging from the job description analysis, a key difference between qualifications of metadata librarians and cataloging librarians is knowledge of emerging technologies, which was required more often of metadata librarians. Examples of this knowledge included familiarity with markup languages such as XML, protocols such as the OAI-PMH, and approaches to conceptual modeling such as RDF. Knowledge of emerging technologies appeared as a required qualification just once in the set of cataloging librarian job descriptions analyzed in 2003 and once as a desired qualification in 2000 (exemplified in the postings as familiarity with XML/SGML and IT). In addition, while cataloging standards, cataloging rules, and foreign language skills continued to rank as the top three required and desired qualifications for cataloging librarians, descriptions for cataloging librarian jobs also listed knowledge of metadata standards as a desired qualification. This qualification for cataloging librarians, along with the requirement for metadata librarians to know MARC, signals the need for a common language between metadata librarians and cataloging librarians; both types of information professionals are compelled to address together a range of resource formats, delivery systems, and content standards in their work.

These findings indicate that descriptions for cataloging librarian positions remain focused on traditional cataloging responsibilities carried out in a predominately MARC-based cataloging context within academic research libraries. Descriptions for the emerging and evolving job of metadata librarian, on the other hand, encompass a much broader suite of metadata implementations, demanding familiarity (if not also experience) with an array of formats, standards, schemas, tools, and best practices. This difference is documented by the increasing list of formats, standards, and technologies found in postings for metadata librarian jobs from 2000 through 2008. The authors assert that, from the research presented here, the position of metadata librarian reflects the rapidly changing nature of cataloging librarianship, suggesting that it is incumbent on both metadata and cataloging librarians to be self-motivated, willing to learn, and flexible.

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Appendix A. Required Knowledge and/or Experience

	Number of Metadata Librarian Job Postings									
Metadata Librarian Requirements	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**Total**
*Metadata experience and (or) knowledge	3	4	5	6	1	5	8	15	15	62
*Cataloging experience and (or) knowledge	3	3	3	2		6	5	12	14	48
*Machine-Readable Cataloging (MARC)	1	1	3	5	1	4	4	7	11	37
*Dublin Core (DC)		3	4	5	1	2	4	8	9	36
*Encoded Archival Description (EAD)		1	4	3	1		1	5	7	22
*Library of Congress Subject Headings (LCSH)	1	1	1			3	4	7	9	26
**Anglo American Cataloguing Rules*, 2nd ed. (*AACR2*)	1	1	1			4	4	6	8	25
*Extensible Markup Language (XML)	1	2	3	3		2	4	7	2	24
*Library of Congress Classification (LCC)	1		1			4	2	5	7	20
Metadata Object Description Schema (MODS)				1		2	3	5	7	18
Metadata Encoding Transmission Standard (METS)				2		1		6	7	18
Visual Resources Association (VRA) standard		2	1	2	1		2	4	6	16
*Text Encoding Initiative (TEI)		2	2	1	1	1	3	4	2	16
Open Archives Initiatives Protocol for Metadata Harvesting (OAI-PMH)			2	2			2	6	4	16
Resources Description Framework (RDF)	1	2	1		1			1	1	7
Hyper Text Markup Language (HTML)	1	2	2			1				6
*Library of Congress Rule Interpretations (LCRI)						1	2	2		5

Appendix A. Required Knowledge and/or Experience (cont.)

	Number of Metadata Librarian Job Postings									
Metadata Librarian Requirements	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**Total**
Preservation Metadata: Implementation Strategies (PREMIS)						1	1	2		4
Committee on Documentation of the International Council of Museums (CIDOC) standards		1			1				1	3
Learning Object Metadata (LOM)				1				1	1	3
Resource Description and Access (RDA)								2	1	3
*Authority control						1	2		1	3
Digital Object Identifier (DOI) system		1	1							2
Geographic Information Systems (GIS)			1				1			2
Federal Geographic Data Committee (FGDC) standard							2			2
Medical Subject Headings (MeSH)								1	1	2
Functional Requirements for Bibliographic Records (FRBR)								1	1	2
Dewey Decimal Classification (DCC)							1		1	2
Cooperative Online Serials (CONSER) program			1			1				2
Art & Architecture Thesaurus (AAT)							1		1	2
Library of Congress Thesaurus for Geographic Materials (TGM)							1			1
Getty Thesaurus of Geographic Names (TGN)										1
Online Information Exchange (ONIX) schema									1	1
Metadata Authority Description Schema (MADS)							1			1
Cataloging Cultural Objects (CCO) standard									1	1
Program for Cooperative Cataloging (PCC)								1		1
Cascading Style Sheets (CSS)									1	1
Extensible Stylesheet Language (XSL)								1		1

	Number of Cataloging Librarian Job Postings									
Cataloging Librarian Requirements	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**Total**
**Anglo American Cataloguing Rules*, 2nd ed. (*AACR2*)	15	13	9	7	6	2	3		1	56
*Library of Congress Subject Headings (LCSH)	13	13	7	6	6	3	3	1	1	53
*Machine-Readable Cataloging (MARC)	11	14	8	7	6	2	3	1	1	53
*Library of Congress Classification (LCC)	13	13	5	5	6	3	2	1	1	49
*Cataloging experience and (or) knowledge	9	6	7	3	5	1	3	1		35
Foreign language	5	10	2		2	2	2	1		24
*Library of Congress Rule Interpretations (LCRI)	2	5	3		3	1	2			16
*Authority control	3	4	4	1	1	1	2			16
Computer skills	6	2	1		2	1				12
Nonbook format cataloging	1	4		1	2		1			9
*Dublin Core (DC)		1	1		2		1			5
*Metadata experience and (or) knowledge		1	1		1		1	1		5
Subject background			4							4
*Text Encoding Initiative (TEI)	1	1								2
*Encoded Archival Description (EAD)		1								1
*Extensible Markup Language (XML)				1						1

*Requirements appearing in descriptions for both types of positions.

Appendix B. Required Performance Skill Sets

	Number of Metadata Librarian Job Postings									
Metadata Librarian Requirements	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**Total**
*Communication skills	1	4	4	5	1	6	7	10	12	50
Ability/willingness to learn		2	3	5	1	3	6	11	15	46
*Work in a team environment	1	3	2	4	2	4	4	5	8	33
Manage digital projects		2	1		1	3	4	6	6	23
*Analytical skills	2	3	3	2	1	2	4	3	1	21
*Interpersonal skills	1		2	2	1	2	2	4	5	19
*Work independently	1	2		1	1	1	3	6	4	19
*Organizational skills		2	1	2	1	2	4	1	4	17
*Problem-solving skills			2	1	1	1	4	3	4	16
*Flexibility to work			1	2		1	3	3	4	14
*Creativity		1			1	1	2	3	5	13
*Detailed work		1	1	1	1		3		3	10

	Number of Cataloging Librarian Job Postings									
Cataloging Librarian Requiremtns	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**Total**
*Communications skills	10	15	7	3	4	3	3		1	46
*Work in a team environment	5	3	4	2	5	4	2		1	26
*Interpersonal skills	8	5	2	1	1	1				18
Service-oriented mind	2		5		2	3	1		1	14
*Work independently	4	4	3			1			1	13
*Flexibility	2	2	3	1	1	2	1		1	13
*Organizational skills	1	6	1	1		1				10
*Analytical skills	2	2	1			1	1		1	8
Professional development		1	3	1	1	1				7
Supervisory experience	1	1	1		2	1				6
Time management	1	2		1						4
*Creativity	2	1	1							4

*Performance skill sets appearing in descriptions for both types of positions.

Appendix C. Desired Qualifications

	Number of Metadata Librarian Job Postings									
Metadata Librarian Desired Qualifications	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**Total**
*Cataloging experience and (or) knowledge	4		1	2		4	2	6	4	23
*Foreign language	3	2	2	2		2	2	3	5	21
*Extensible Markup Language (XML)		2	4	1	1			5	3	16
*Integrated Library System (ILS)	1	1	2	1		4	4	2	1	16
*Metadata experience and (or) knowledge	1	2	2	3	1		3	1		13
*Machine-Readable Cataloging (MARC)	1	1					2	7	2	13
Anglo American Cataloguing Rules, 2nd ed. (AACR2)		1	1	2			2	3	1	10

Appendix C. Desired Qualifications (cont.)

	Number of Metadata Librarian Job Postings									
Metadata Librarian Desired Qualifications	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**Total**
Experience in supervising	2			1		1		3	1	8
ContentDm						1		2	4	7
Extensible Stylesheet Language (XSL)				1				3		4
Open Archives Initiative Protocol for Metadata Harvesting (OAI-PMH)				1			1	1	1	4
DSpace				1				1	2	4
XML Linking Language (XLINK)							1	1		2
Copyright law/Issues in digital library							1	2		3
Standard Generalized Markup Language (SGML)			1	1						2
Open Archives Initiative Object Reuse and Exchange (OAI-ORE)									1	1

	Number of Cataloging Librarian Job Postings									
Cataloging Librarian Desired Qualifications	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**Total**
*Foreign language	9	6	3	3	3	2		2	1	29
*Cataloging experience and (or) knowledge	11	7	1	4	3			2	1	29
*Integrated Library System (ILS)	8	8	1	3	4		1	2	1	28
*Online Computer Library Center (OCLC)	4	6			2			2	1	15
*Metadata experience and (or) knowledge	2	4			3	1		1	1	12
Nonbook format cataloging experience	2	7	2			1				12
Subject background	7	2	1		1					11
Authority control	5		1		1	1	1	1		10
Professional development	1	6					1		1	9
Second master's degree	2	2	1	2			1			8
Library of Congress Classification (LCC)	2	2					1		1	6
Cataloging electronic resources		2	1		2			1		6
Database maintenance	3	1	1					1		6
Library of Congress Subject Heading (LCSH)	2	2					1			5
*Machine-Readable Cataloging (MARC)	2	2					1			5
Project management experience		3			1		1			5
Computer skills	1	1		1				1		4
Innovative interface system		2		1	1					4
Dublin Core (DC)		1			1					2
Information technology	1							1		2
Encoding Archival Description (EAD)		1								1
*EXtensible Markup Language (XML)/SGML	1									1
Digital collections experience								1		1

*Desired skills sets appearing in descriptions for both types of positions.

Challenges and Possibilities for Collection Management in a Digital Age

By Tony Horava

This paper considers some of the major issues concerning collection management in academic libraries in a rapidly changing environment. Specifically, this paper reflects on core values, scholarly communication issues, acquisition activities, access and delivery issues, and innovation. The paper concludes with ideas for incorporating shifts in these areas into a sustainable, forward-looking approach to collection management.

What is collection management in the digital age? Our environment is fast-paced, driven by rapid changes in information technology, emerging areas of interdisciplinary research, a profusion of new digital resources, budget constraints, changes in teaching practices and learner expectations, and shifting institutional policies and priorities. What happens to collection management in this sea of information resources and formats, access methods, and budgetary choices? This paper seeks to answer this question by exploring collection management in terms of core values, scholarly communication issues, acquisitions activities, access and delivery issues, and innovation. It concludes with reflections for charting the future of collection management.

We can begin by asking what can be a valid and tenable concept of collection management. The problem is far more complicated than it was in the predigital age. Collection size and scope, as determined by holdings counts, particular strengths, and unique materials, were formerly understood in relation to institutional mission and programs. The "tonnage" model of collection building traditionally has been focused on breadth and scope of owned resources, although this is starting to change as the importance of access to leased resources is recognized. Mapping resources to an institution's collective needs was challenging but not impossible. The universe of available publications and formats was finite; with professional experience, one could connect the dots to recognize its size and scale in relation to a specific collection's desired parameters. Johnson notes that collection management was proposed as a concept in the 1980s: "It includes collection development and an expanded suite of decisions about weeding, cancelling serials, storage, and preservation."[1]

While these core activities remain integral to our work, their scope has altered significantly. Selection of new material, weeding of less important items, storage off-site, and preservation in various formats are best understood in the

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context of our dramatically changing information landscape. This includes the transformation in scholarly communications practices, the broad impact of information technologies and communication devices on the use of the collection, new forms of information-seeking behavior and learning styles, and the explosion of online resources for obtaining, using, and sharing knowledge and research. Taken together, these changes present a challenge to our time-honored practices and strategies. Can we reinvent our roles to incorporate the new realities of our cultural and technological environment? What are the implications for our understanding of collection management only decades after its recognition as an important field within the library world?

Traditionally, pride and prestige were imbued in the hundreds of individual daily actions of building a permanent collection that would serve our community's present and future needs with reasonable effectiveness. In many respects, size did matter. Quality and quantity were interwoven values. The warehouse was the typical metaphor for describing this approach, but for many large libraries it was more akin to building a cathedral. The zeal had a transcendental, pseudo-religious quality to it. The collection had a sacred element for those who contributed in diverse but cumulative ways to support learning and scholarship. The book collection, not surprisingly, played a central role in how the overall collection was understood and perceived. Books, in their vast quantity and depth of argument, commanded awe and respect in ways that journals and other formats never could, particularly in the humanities and social sciences. However, Sandler puts this in sober perspective:

> Libraries are not about books; they were, are, and will be about facilitating communication across space and time. Books have been a way to do that historically, but today there are other, often better, ways to accomplish this. Libraries need to become facile at supporting all sorts of media, and they must continue to embrace the new, or face the consequences of losing relevance to the mainstream culture.[2]

Approaches to collecting material have evolved over time in the context of our institutional role, our financial resources, and the formats for containing scholarly information. Gorman summarizes how the understanding of a library collection has changed over the last century or so:

> The definition of a library collection has expanded over the last 125 years to comprise at least four levels: locally owned physical documents; physical documents owned by other libraries but available through ILL; purchased or subscribed to electronic documents; 'free' electronic documents.[3]

This reflects several major developments, such as the establishment of resource-sharing networks (e.g., interlibrary systems and union catalogs), the increasing importance of digital materials for education and scholarship, and the growing availability of free digital resources that are deemed valuable to students, faculty, and other researchers. The challenge lies in how to balance libraries' finite resources of money, time, and energy against these several directions of collection focus. No single approach will suffice because each will be important for addressing the library community's diverse information needs and educational goals. These are complementary collection strategies that allow us to offer a hybrid of core and specialized resources, owned and un-owned. Viewed together, they challenge the traditional collection-building assumptions of permanence, control, and relative comprehensiveness. Traditional approaches to budget allocation, collection development policies, acquisition workflow, and preservation honed over several decades will need to be realigned in relation to these intertwined collections strategies.

How we reformulate our practices of selecting, acquiring, and disseminating a collection is one of the most difficult issues we face. Lee notes that "tangibility, physical collocation, format, and ownership are no longer adequate for conceptualizing a collection. Unfortunately, they have deep roots in the traditional thinking, and will take some effort on our part to get rid of them in developing and broadening collections."[4] As we navigate in the new era, we are often taken out of our comfort zone. Our collections should assist patrons in making sense of the world; i.e., collections should help patrons solve the wide range of intellectual, social, and cultural problems they want to address. We need to redefine the collection in ways that correspond to how our users engage with scholarly information resources, regardless of format, to meet this goal. If we do not provide timely and tailored resources for sense-making, other interests with commercial motivations will fill the void, thus undermining the basic purpose of the collection. This brings to mind one of Ranganathan's laws—"Books are for use." This simple but meaningful dictum applies to all media and resources.

Moreover, we need to consider our priorities for content and interactivity differently. These cannot be separated into discrete compartments for attention. Content and interactivity now are intimately linked in ways that were impossible before the digital era. Therefore the content—whether a scholarly article, blog posting, systematic review, government report, digital map, or e-book—needs to be assessed not only on the quality of its content, but also in relation to how it can be used, shared, repurposed, and integrated into teaching, learning, and research. Being a creator, publisher, and consumer of information are facets of the same continuum of activity. Disintermediation has become a hallmark of autonomous behavior in communication

and information-seeking behavior. Individuals follow their own course of inquiry without needing any guidance from information professionals such as librarians. The ubiquity of media mash-ups and format and time shifting are a natural element of this continuum. These online behaviors challenge collection practices developed in a print era.

Another marker of our intellectual landscape is the separation between content and container, or information and artifact.[5] The digital medium is expanding information visibility enormously, both where the unit of meaningful information is small (e.g., a paragraph) and where it is much larger (e.g., an entire book). This expansion of information visibility has several implications for libraries. We need to expose the full range and depth of information content within our traditional containers. Our public tools need to allow this deep mining to occur as seamlessly as possible for the patron, and we need to think in terms of a knowledge management approach to our collections.

Core Values

Various core library values are implicit in our common understanding of collection management. Several come to the foreground: equity of access, intellectual freedom, open access, stewardship, and trustworthiness. Equity of access assumes that everyone should have the ability to use the collection for his or her own needs; no one should be excluded. Reducing and eliminating barriers is grounded in democratic principles, and it has been an important thrust of library activity. The marked trend toward greater protection for intellectual property rights holders has unhinged the delicate balance between competing interests between users and rights holders, thus pushing our profession to adopt advocacy and teaching strategies in response.

The idea of intellectual freedom, or freedom to read, underlies the notion that the collection should not be censored. For all publicly funded libraries this has been ethical bedrock, and the battles fought over the years are evidence of this steadfastness of purpose. The notion of a balanced collection is integral to how we perceive our professional responsibility. We inherently aim for developing a collection that presents equilibrium of numerous perspectives, interests, and ideologies in a well-rounded manner. While censorship can be subtle, such as the practice of self-censorship, our long-standing opposition to censorship has helped define how collections are developed.

A belief in the value and importance of open access (that is, access to resources that are digital, online, free of charge, and not limited by copyright and licensing restrictions) has taken firm hold in the library community. Open access is viewed by many as the legitimate and fundamental form of scholarly communication for taxpayer-funded research in the library community and in many research communities. Open access peer-reviewed journals, public domain e-books, and large-scale cultural memory archives such as the Library of Congress's American Memory Project (http://memory.loc.gov/ammem) or the British Library's Online Gallery (www.bl.uk/onlinegallery) have demonstrated the value of these resources as a public good. As we select and make accessible these resources via numerous channels—such as Web portals, link resolvers, catalog records, and federated search tools—we are implicitly telling our patrons that they have met our standards of quality and relevance and are to be used alongside commercial, fee-based information resources. For the patron who does not know and does not care whether a resource is free, the provision of access via the library is a credentialing, deliberate function that has collection-related implications. How we count these resources in our management reporting activity is of less importance than the enhanced value that they provide to our patrons, who want timely and relevant resources that can help them achieve their educational and research goals.

Commitments to open access can take various forms, e.g., a fund to defray authors' publishing costs, an initiative to fund journal or book publishing, advocacy efforts, organizational membership contributions, and cancelling paid subscription titles in favor of open access alternatives. Many approaches intersect with political and fiscal challenges in the library and the academy for funding and attention. Some of these costs may be allocated to the acquisition budget and thereby affect the priority given new titles; the financial pie needs to accommodate these choices. Demonstrating leadership in our institutions and navigating these political issues is a frequent role for collections librarians and others. The simultaneous increase of support for open access and of our commitment to scholarly electronic resources from commercial publishers is one of the key paradoxes that we need to assess and confront. How long before this parallel approach is no longer financially viable? We continue to acquire new digital resources from these publishers, whether via subscription or purchase options. How much longer can we continue to pursue both strategies simultaneously before this becomes philosophically and financially indefensible? The pressures on our budgets will continue to grow. Much depends on where the funding for open access scholarly communications originates and how this affects libraries' acquisition budgets. The political stance of libraries' parent institutions in relation to an open access program also will play a crucial role in this dynamic.

Stewardship is a steadfast value. The fragility of digital (and print) collections has become all too apparent as formats change, hardware is superseded, and software is rapidly made obsolete. The risk factors contributing to the loss of digital data have been highlighted by many, e.g., by the report of the Interagency Working Group on Digital

Data to the Committee on Science of the National Science and Technology Council.[6] Certifiable standards for preservation based on best practices have become essential for how we envision the future of our collection. Collective and collaborative efforts are becoming the norm for preservation efforts given the scope of time, money, and resources involved in establishing a cohesive, long-term model. The division between preserved and nonpreserved materials in our collections is a fault line that is growing wider every year. The former will provide durable access and document integrity; the latter will encompass all other materials for which the long-term future is dubious. Because durability of access and availability are critical for future generations of students and faculty, libraries' actions in regard to stewardship are an essential marker for how we define our role in protecting and managing our collections. The slow-burning fires of acid paper books deteriorating into oblivion are paralleled by the cyber fires of digital content that can disappear with frightening speed as online objects become unreadable or unfindable. Dempsey and Childress' collection grid provides a graphic illustration of the range of resources in library collections, the degree of uniqueness of these resources, and the degree of care required for effective stewardship.[7] Stewardship decisions require careful planning and long-term commitment, as well as particular attention to metadata creation and choice of standards. Stewardship of scholarly resources in various formats for future generations is commonly recognized as one of our most important values and one the most serious challenges we face.

Trust becomes even more important in today's environment—trust saves the user's time, keeps the user's attention, and provides an implicit stamp of quality. This is true whether dealing with free or fee-based resources and regardless of format, location, or provenance. The library's brand of trust remains an important asset to exploit to our advantage regardless of the formats or types of resources to which we are providing access. Atkinson has noted that

> the universe of information has become so much more complex, its contents so much more varied with respect to quality or reliability or utility, that the user's need for some kind of intermediate sort, to designate or privilege subsets of materials that are more immediately authoritative and useful, is much greater and more warranted than was ever the case in the traditional environment.[8]

This speaks to the importance of accurate and comprehensive metadata and the need for an abundance of virtual access doors to the collection, such as search engine referrals, open URL link resolvers, federated search tools, Web portals, and, of course, the catalog. Making these multiple doors to the collection seamless and simple for the patron is an ongoing issue for all librarians to address. As the digital collection expands in many directions, this issue becomes more and more significant.

Scholarly Communication Issues

Scholarly communication—the complex exchange of discoveries, ideas, and information—is being transformed. A generation ago, librarians assumed that a collection, whether in print, microfilm, or audiovisual formats, was tangible and that it was owned by the institution. Even if some materials needed to be moved to off-site storage, mechanisms such as document delivery services, consultation rooms, and catalogs of holdings ensured discovery and easy access to the full collection. Resource-sharing agreements, such as interlibrary loan networks, were designed to fill the gaps in a local collection. The postsecondary educational system and research infrastructure expanded enormously on a global scale following World War II. The quantity, range, and size of research journals grew exponentially. Many new fields of inquiry were developed at the interstices of traditional disciplines, developing new foundations of theory and practice, new specializations, and a flood of publications that embodied these new discourses. Some examples are microbiology, area studies, globalization, women's studies, e-commerce, and bioethics. The melding of multiple traditional domains of knowledge in cross-disciplinary research illustrates a central challenge of collection management, i.e., scoping the extent and degree of publication coverage for a specific research discipline while recognizing the interrelatedness of many different clusters of intellectual inquiry. How far do we extend our reach? Teamwork and collaboration are foundational to most areas of research today. How should our acquisition fund structure and budget allocation respond to this discourse of cross-fertilization?

The Association of College and Research Libraries report *Establishing a Research Agenda for Scholarly Communications* highlights the many new forms of scholarly publishing, and notes that "blogs, wikis, and other new media are advancing scholarly discourse outside of comfortable definitions of the scholarly publishing landscape."[9] Coping with the profusion of forms of scholarly publishing, variable notions of authorship, and challenges of selecting materials—all while managing a library collection budget—is no simple matter. It involves prioritizing needs, planning for effective access, and integrating resources into coursework and research agendas. Casserly asks, "How will your library establish a focus on collection content in the changing landscape of scholarly communications?"[10] To do so will require a steady focus on the scoping criteria in our collection development policies to be able to apply them to new types of content, most of it digital. The standard principles

of selection—such as authority, originality, impact, timeliness, breadth and depth of coverage, and demand—are ever important, but they must be expanded to encompass new forms of scholarly communication and publishing.

A growing awareness of the importance of retaining author rights and copyright issues for permitted uses and limitations on the use of library materials has been a theme of our times. We need to monitor developments in these areas to ensure access. This will encourage a broader approach to defining collection content to include material for which the library has played and continues to play an active management role, such as an institutional repository service and open access scholarly journals and books. This new approach requires a broader understanding of how we access and manage the collection content in collaboration with many players in the libraries, institutions, and other organizations. The interconnectedness of the inputs and outputs of the scholarly communications system are becoming more apparent. Copyright education and outreach has become recognized as an area where the library needs to take a leadership role in the institution, from both a teaching and a knowledge management perspective. Advocating for scholarly communication issues could become a core responsibility for liaison librarians, reflecting the strategic importance of these matters in academic libraries.[11]

In the networked world, knowledge is mutable, fragile, accessible, and deliverable in forms that were previously impossible. The explosion of knowledge is exponential as the scale of digitally available research expands in breadth and depth by the hour. Knowledge management is becoming an essential dimension of what we do. The value of a collection is understood not only in the acquisition of scholarly information resources but in the enabling of discovery through tools, practices, infrastructure, and collaboration. This can include citation management software, tools for textual and linguistic analysis, social media technologies, course management integration of information resources, the library's embedded presence in academic departments, and publishing and preservation initiatives. How the collection is integrated into the workflow of the researcher is becoming critical to the value and impact of the collection and the library as a whole.

The blurring of traditional boundaries has become a hallmark of our age. The interconnections between our services and collections are a consequence of the technological, social, economic, and educational climate in which we work. In a convergent, networked world where information abundance and immersive interactivity are dominant, everything is related to everything else. As active players in open access journal publishing, institutional repositories, and advocacy efforts for reforming the structure of the scholarly communications ecosystem, we are integrating collections activities into the broader spectrum of public policy and cultural discourse. Collection management needs to be seen in terms of how we create rich, interactive spaces (both virtual and physical) in which the value of our resources can easily integrate into the scholarly communication behavior and research workflow of our patrons.

Finally, our special collections represent a rich legacy and scholarly resource that we need to exploit more fully for discovery and learning purposes. Correspondence, diaries, narratives, reports, and oral histories are a few types of primary research material libraries can offer. As many library collections look more homogenous in the digital age, particularly in relation to licensed electronic resources, special collections of primary and local material create a presence of unique materials for discovery and learning. In the words of a recent Association of Research Libraries (ARL) report on the state of special collections, we need to recognize "the unique and irreplaceable contribution that special collections make to scholarship and learning and to the general public good."[12] These collections represent a form of scholarly communication that we need to promote in a much more accessible manner through digitization, online finding aids, durable URLs, and integration into course assignments and research projects.

Acquisition Activities

Acquisition activity is characterized by several key challenges: budget allocation, pricing models, licensing options, and new technologies for managing approval plans and workflows. As the scholarly information landscape has been transformed by the availability of new resources in various digital formats, the irreversible trend toward acquiring these formats has been clear. Libraries are now spending a large portion of their acquisitions budget on electronic resources. ARL data from fiscal year 2008 show that "in every year of the last decade electronic materials expenditures have grown sharply, anywhere between two and ten times faster than other materials expenditures have" and that the average ARL university library was spending "51% of its materials budget on electronic resources."[13] This growth has had a major impact on workflows that typically were geared toward print purchasing and processing. Libraries have been required to reprioritize their collection development strategy and constrained budgets in terms of the value of digital content versus other delivery forms. Print books, while still important in various disciplines, compete for scarce dollars with digital products that are available remotely and that can be incorporated into new workflows. We face a bewildering variety of pricing frameworks for content in digital form (e.g., subscription, one-time purchase, purchase with annual access fee, new data fees based on additional content, cataloging record fees, etc). This is further complicated by consortial

acquisition options that offer substantial benefits but greatly diminished local autonomy over content selection decisions and price implications. What pricing models are employed? What is the cost-sharing model? Is central funding available, and under what circumstances? These are some of the questions that come with consortial acquisition. The Big Deal (purchasing all or most of a publisher's list of titles with some guarantee of cost containment) has its supporters and detractors, but all agree on the need for greater flexibility to provide more options regarding content inclusion, swapping and replacement privileges, cancellation rights, and post–cancellation access to subscribed content. In many academic libraries, Big Deal agreements consume a large portion of the acquisition budget, thereby narrowing options when budget restraints force a cancellation program. This all-or-nothing approach reduces the options for reassessment. The deep tensions between individual title selection and the package model have become evident in many libraries facing budget restraints because of the global economic downturn.

Overlaying the pricing smorgasbord is the range of licensing frameworks—the terms and conditions that govern the contract between the library and the provider. User rights, library responsibilities, vendor responsibilities, and legal boilerplate issues (such as governing law and indemnification clauses) are integral to licensing arrangements. Issues such as post–cancellation rights, perpetual access, preservation arrangements, and user rights (in relation to copyright and intellectual property) are especially significant. These have a direct effect on pricing because of the costs involved in maintaining business relationships between vendors and libraries. License negotiations have become a critical aspect of acquisitions activity during the past decade, and a new skill set has become essential for acquisition and collection librarians involved in these activities. This includes an understanding of the publishing landscape, knowledge of new formats of content and new areas of research, negotiations acumen, budget understanding, and a holistic awareness of the library's role and the community's expectations for research support and delivery channels. The development of model license agreements as negotiation tools has been important for promoting library and user interests in a proactive manner. In the print era, the library owned the material it acquired, and copyright legislation was perceived as providing a reasonable balance of rights and protections. In a digital era, the collection is a contentious trigger of intellectual property disputes that are fraught with divergent views and values held by content creators, rights holders, and librarians.

Sustainable practices for acquisitions will leverage new technologies, streamline workflows for material selection and acquisition, and optimize collaboration with vendors and publishers. The widening of approval plans through blanket instructions for book series, instructions for automatically receiving books associated with prizes and awards, and implementation of treatment-level profiling are examples of such practices. These actions can increase the quantity of books acquired automatically and free time for selectors to focus their attention on more complex collection development matters. The adoption of electronic invoicing in the integrated library system's acquisition module involves batching the record creation and payment for new books, thus making the process more efficient. Implementing shelf-ready processing services from a vendor, as well as batch-loading MARC records, is well worth the initial investment of time and energy. Direct ordering of new titles in the vendor system by collection librarians also can lead to efficiencies of scale while providing a greater sense of control over the process. The goal should be a timely and efficient delivery of material to the patron, regardless of format or location. Operational workflows should leverage vendor services to streamline acquisition processes and redirect staff to atypical or complex issues that an automated process cannot address.

Access and Delivery Issues

Access is another fundamental facet of how we are reformulating the utility and effect of a collection. Not long ago, access to information resources was by necessity on-site. The bricks-and-mortar library created a sense of place, a feeling of familiarity, and an immersion into the wealth of resources amassed for browsing and discovery. The digital culture of today requires that resources are available 24/7 and are integrated into the information-seeking behavior of students and the workflow of faculty. Shifting seldom-used items and those duplicated by digital surrogates to off-site storage has led to a transformation in the purpose of library buildings, which are becoming study and learning hubs where many resources are available virtually. In many libraries, the large-scale transfer of print monographs to off-site storage has created major tensions between the library administration (which is driven by space and budget pressures) and the faculty (for whom browsing the bookshelves is integral to the research and discovery process). It may be a generation or two until a consensus forms around this visceral issue.

Resources that are only available on-site, such as print books, print journals, and microforms for which no digital surrogates exist, are overshadowed by digital resources that are seamlessly available from wherever a student or professor happens to authenticate access. If an item is not available online, it has less and less importance to many of our patrons. The treasures of our book collection will not be unlocked by the next generation unless these books are available online. Faculty at the University of California, according to a Mellon-funded study on scholarly communication, felt that

online publication had significant advantages:

> These include the ability to reach a larger audience, ease of access by readers, more rapid publication even when peer reviewed, the ability to search within and across texts, and the opportunity to make use of hyperlinks. Administrators and faculty both cited the fact that new technologies enable innovation in scholarly work.[14]

Discoverability and the manipulation of objects (e.g., tagging, annotating, and sharing) are becoming more crucial with the evolution of our collaborative, media-shifting, online culture. Undergraduates and graduates, who have largely integrated online culture into their daily social and educational experience, would see these advantages as a given. Horwath and Williamson suggest, however, that the technical savvy and advanced intelligence of our patrons, particularly the Millennial generation, have been overblown and need to be balanced with a sober understanding of how they navigate the complexity of a library's resources.[15] Navigating this balance remains a continuing challenge.

We need to focus not only on the range and types of material that our patron groups require, but also on how the resources we acquire can lead to effective learning outcomes. In so doing, we will be demonstrating clearly how the collection can be instrumental to curricular objectives and individual learning. We need to view our patrons in terms of specific groups with particular needs, such as distance learners, international students, students with disabilities, and mature students, rather than as generic aggregations, such as undergraduates and graduates. This will lead to greater understanding of their needs in relation to our collection. While promoting widespread use of resources is an essential responsibility that creates value and impact, this is not an end in itself, but a means to a large purpose: developing the information competencies and analytical skills in students that are essential for achieving success in their studies.[16] Being attuned to the research agenda of faculty—whether they are newly hired, senior members, or part-time or visiting scholars—is integral to how successful we are in tailoring our selection and acquisition functions to the diverse needs of this community. Knowledge creation in its multiple forms and purposes—for teaching, learning, and scholarship—determines our collection's value for our patrons and our role in facilitating and enhancing this holistic and interconnected process.

The range and types of material that our patron groups require can be a key driver to our budget allocation and the difficult fiscal choices that we need to make. Ultimately, this speaks to the mission of the institution. One can readily concur with Bodie and Maier-O'Shea, who recommend "developing a collection, regardless of format, that meets curricular needs but also addresses the interdisciplinary nature of learning outcomes; recognizes the disparate intellectual, cultural, and social needs of a diverse student body; and supports the library's outcomes for information literacy."[17]

With a few exceptions (such as rare books and ephemeral material that do not yet have digital surrogates), the dichotomy between on-site and remote access will determine the visibility and use of our resources. Moreover, as we develop more tools such as bookmarking, tagging, and integration with course materials to allow interactivity and flexibility in how patrons engage with these resources, we are creating a richer experience that demonstrates the value of the library's collection in new and innovative ways. In so doing, we are embracing the new forms of learning and communication that have shaped the generation of digital natives.

Innovation

We need to consider the dynamics of innovation in light of the "innovator's dilemma," as articulated by Lewis in his commentary on the book *The Innovator's Dilemma: When New Technologies Cause Great Firms to Fail*, by Clayton Christensen.[18] Lewis writes,

> Established organizations generally fail when change involves disruptive technologies, and organizations at the periphery or from different sectors succeed. . . . Invariably cheaper and faster, disruptive technologies are often easier to use even if quality is not high and capacity is not large at the outset. In general, disruptive technologies require new service models and pricing structures that challenge established organizations and the interests and expertise of the individuals within them.[19]

These are prescient words. One needs only think of various initiatives like Google Books, Open Content Alliance, Amazon, and LibraryThing to realize that these alternatives enable individuals to search, retrieve, and share information faster and more seamlessly than does the library's traditional approach to information resource delivery. We need to focus on the ways our patrons communicate, search, share, and repurpose information if we want to remain effective and successful. We need a blended approach that integrates these technologies into our mainstream rather than repudiating them as peripheral or nonacademic. This is a huge challenge to our thinking and our habits. The conservatism and risk aversion often endemic to academic culture can pose a real problem in soberly examining our environment and adopting innovative approaches. The transformations

in learner expectations and communication forms that are occurring all around us require a measured response. This could include, among other things, patron-driven acquisition models, pay-per-view systems, print on demand, and unconventional partnerships with information providers for new value-added services. The disruptive collection, marked by a new understanding of how technology and user behavior are twined, is a consequence of our social and educational landscape. The flip side of disruption is opportunity, and we need to see the enormous opportunities afforded by a disruptive landscape in reconnecting with our patrons in new and effective ways. Martin asserts that "to be skilled at the unorthodox just might be the single greatest leadership skill needed for future library leaders."[20] The challenge for collection management is to retain the best of our traditions—our values, our experience, our knowledge—while embracing the opportunities that allow us to see our critical role in a more imaginative light. The challenge is how best to bring this rich presence to our patrons' attention and use.

Our collections are not disappearing. On the contrary, they are becoming extraordinarily important as our Web presence allows us new capabilities to connect and be relevant to the population we serve. By focusing on remote access, active stewardship (locally and in collaboration with external groups), a heightened awareness of learning outcomes and the researcher's agenda, and a carefully nuanced, sustainable approach to acquisition activity, we can enhance the value and use of our collections. However, a new understanding of the collection needs to be counterbalanced by the human qualities of service and expertise that we bring to the enhanced exploitation of scholarly information resources. Our traditional emphasis on selecting, acquiring, and disseminating the works of recorded knowledge needs to be enhanced by a broader approach that emphasizes building innovative bridges between intellectual works and the people who are using them in new ways to solve new problems.

In the era of information abundance and multiple pressures on collection building practices, significant portions of our collections are rarely or never used, and this is becoming a risky liability. This issue is not new (the 1979 Kent study at the University of Pittsburgh, found that 26.8 percent of the monographs in the University of Pittsburgh library accounted for 82.2 percent of the use), but we are only beginning to address it.[21]

The very term *collection building* has a whiff of the warehouse that is no longer relevant to our goals. Anderson's view "that most research libraries should seriously reconsider their traditional strategy of meeting patrons' needs by building large, inclusive, speculative collections that attempt to anticipate them" is well taken.[22] To paraphrase Einstein, everything has changed except our way of thinking. We need to seriously consider the implications of the abundance paradigm and the new realities of learning and information-seeking behavior in how we define success in collection management. The targeted, just-in-time delivery of value-added information at the point of need is how we can demonstrate relevance in the attention economy. We are only beginning to reexamine the purposes and practices inherent in collection management in light of the massive shift in the production and distribution of information in the global supply chain. With intense competition from a range of information providers such as Google, Amazon, and Microsoft, complacency is not an option. Developing a culture of assessment also has become essential to best practices in collection management. Lakos and Phipps argue that "libraries are challenged to be nimble, innovative, responsive, proactive and, most of all, able to demonstrate their value."[23] Collection assessment can employ many methods and strategies, whether use-based or user-based. Libraries need to consciously focus on approaches that can lead to tangible measures of value to their patrons.

Immediacy of the collection is becoming critical to our success. Networked resources need to be equally available on mobile devices, laptops, and home computers. How to finance, license, and deliver information resources in multiple formats and delivery options are important questions. The answers will exert greater pressure on our budgets and our allocation decisions. Various resources may need to remain in print if circumstances require it. Rapid and wide diffusion of scholarship, formal and informal, is erasing space and time boundaries in the researcher workflow. The massive Google Books Library Project raises a profound and unsettling challenge to the future of libraries and to our collection activities in particular. Do we still need a library collection? We instinctively answer yes, but we need to reposition our thinking in a way that demonstrates the unique value that the collection provides. While many disquieting questions surround the Google digital library, including its long-term durability, its business model, and the quality of its metadata and image files, the issue is not one of competing with Google but of demonstrating how we offer unique value and services that allows students to achieve their learning goals and researchers to further their programs. Regardless of how we define the form and scope of our collection activities, we are still privileging some materials over others, and we are still anchored in the core values that have animated our work for many generations. Our core values have not changed, but our means of expressing these values through our work are drastically changing.

Outline of a New Approach

The following ten ideas are suggestions that can redefine collection management in the networked era.

Focus on what is sustainable. With many competing

demands on the acquisition budget and collection development strategies, there are definite limitations on which needs we can satisfy. Since we cannot be all things to all people, how do we prioritize what is essential over what is not? Sustainability involves an understanding of how we can marry best practices to strategic goals to achieve high impact for our diverse patron community. This can include a thorough implementation of approval plans, including shelf-ready processing, enabling direct ordering of materials by subject librarians, embedding librarians in academic departments to better exploit the collection, and consortial acquisition strategies to achieve greater value for limited dollars. Reconceptualizing our physical collection space to emphasize learning and collaborative opportunities can mean large-scale transfer of little-used print monographs to off-site storage, though this can be politically challenging and requires careful planning and nurturing. What is sustainable will vary greatly from one institution to another, but what is important is to create a dialogue that allows everyone involved to contribute to the articulation of a well-planned strategy.

Consider what a collection does rather than what a collection is. The ways in which a collection is integrated into the researcher's workflow is becoming critical for the optimal use of the materials. The easier the integration, the greater will be the use of our resources, thus allowing us to demonstrate the added value that the library collection and the staff bring to the academic enterprise. What tools do we have to support the information-seeking behavior of researchers, such as citation management software, document delivery options, OpenURL linking, federated discovery tools, computational analysis tools, and social media? What technologies should we be investigating in more depth, e.g., mobile devices and readers? Workflows and information use vary greatly by patron community. Faculty in natural and applied sciences conduct research differently from those in humanities and social sciences, and differences exist within each department or research area. There is a range of specific student audiences, such as mature students, distance students, international students, and exchange students, as well as the conventional division of undergraduate and graduate students by discipline. How effective is the collection in meeting the diverse information-seeking behaviors and workflows of these groups? This is no easy task, but one worth considering when we examine the service infrastructure that is supposed to optimize the use of the collection.

As our parent institutions are changing, so must we. New research programs are being adopted, new scholars are being hired for teaching and research, and departments are being realigned, merged, or downsized. The scholarly information requirements are changing as a consequence. Knowledge has become thoroughly multidisciplinary. Staying on top of this dynamic evolution is challenging but essential, especially for enabling us to argue for additional financial support when decisions are being made at a curriculum-planning level. Because collection building is complex and long-term, the need to be more agile in shifting approaches in response to new institutional directions is becoming more important for remaining relevant and effective. If the collection is not a reflection of the institution it serves, we risk becoming marginalized as researchers look elsewhere for information resources.

We must make strategic decisions about what formats we support in the multi-format universe. While we do need to support a variety of formats, the appropriate mix will depend on a thorough understanding of our patrons' needs and information behaviors, our assessment of new technologies, and our budgets and planning processes. Our technological expertise in supporting different formats also is a factor, whether for books, journals, audiovisual material, music resources, or GIS data. By monitoring new technologies and devices, we can better anticipate what is important and what is merely a passing fad. Many institutions are undertaking pilot projects with various mobile devices, such as the Kindle and the Sony eBook reader, to provide experience in their use. More important, however, is the strategy used in assessing and prioritizing these devices and formats in relation to what we currently support. Which formats will be optimal from an access perspective and from a preservation point of view? Our world of "containers" is becoming very volatile, fast-paced, and unpredictable.

Changing current practices will add value for our patrons. Disruption can be an opportunity for innovation and refocusing our efforts. As mentioned earlier, some possibilities include pay-per-view models, patron-driven acquisition systems, print-on-demand, and supporting alternative scholarly publication models. Questioning long-standing practices can lead to a shifting of resources and new and creative ways to deliver materials to our patrons. Disruption can be difficult and painful in the face of long-standing assumptions and practices, but the status quo will not suffice to retain our position in the academy or add value in the minds of patrons. With limited staff and financial resources, seizing new opportunities will mean decisions to let go of nonessential practices or activities.

We must seek the right balance between competition and collaboration. Librarians often stress the importance of collaboration, particularly in relation to consortial purchasing, shared cataloging, and resource-sharing arrangements for interlibrary loans and off-site storage. However, as institutions compete intensely with each other for faculty, students, and research dollars, acquiring and supporting highly specialized and often expensive research resources can be a way of attracting people to one's institution. With respect to collection management, how do we manage the delicate

balancing act between competition and collaboration? This is an issue that continues to bedevil us. We need to be more frank about the political dimensions of the collection and the strategies that we consequently adopt. The line between competition and collaboration is a gray and nebulous zone. It will shift toward one pole or the other depending on circumstance, and we need to recognize that collaboration is often overshadowed by the competitive reality of the postsecondary system.

We must seek creative partnerships with publishers and vendors. Our relationships with publishers and vendors are essential for success in our collection development practices, whether it is for content acquisition, selection and ordering workflows, MARC record acquisition, or the physical processing of new items. These partnerships will evolve in relation to new opportunities and collection needs. However, this must be put in perspective. Publishers and vendors are neither our friends nor our enemies; they have a job to do and so do we. Our interests overlap but are not strictly mutual. Therefore our relations need to be governed by professionalism, integrity, and a forward-looking attitude. In this manner we can collaborate in new and productive ways that build on mutual opportunities and interests. We need to think more carefully about how we can maximize these relationships in relation to new technologies, new institutional directions, and the wide range of formats and information resources available.

We need to measure collection value in new ways. We need to have a wide-ranging dialogue with our patron community about what forms of access create value for them. How we determine return on investment is a question of signal importance to senior administrators and external stakeholders. Contribution to the organization's mission and priorities is a closely related issue. The quality of access has supplanted the raw counting of owned resources as a method of assessing our impact. The availability of many forms of access can lead to new types of interaction, collaboration, and discovery. Collection assessment as a practical and strategic activity can drive new value indicators and insights into understanding the ways our collection meets research and teaching requirements. This is related to the importance of promoting learning outcomes to measure tangible benefits of our collection activities.

We need to exploit our new understanding of the collection to the best of our ability. The collection is everywhere and nowhere—it is a cloud of distributed resources in a variety of places around the globe that are made centrally available via the library. This is a new paradigm that we are still assimilating into our practices and our thinking. Unlike the past, we cannot point to any single location or site to explain or define the scope of the collection. To our patrons, accustomed to 24/7 connectivity and seamless full-text access to information resources, this means that the collection is a steady presence to which they have easy access at the point of need. The physical collection is one site among others in space and time. The cloud collection is both an exciting reality and a turbulent state of practice that we are addressing in our workflows, policies, and practices.

Collection librarians must expand their skills and expertise. To effectively develop and manage our collections in the networked era, we need collection librarians who have the right set of skills and aptitudes. This can include an understanding of the scholarly communications and technological landscape, a curiosity to explore options for integration with research and teaching, an ability to build innovative bridges with our patron community, and a passion for exploring new formats for knowledge and new approaches to learning. Traditional skills and expertise, such as budget management, subject knowledge, vendor relations, and understanding of preservation options, can be layered inside these newer skills.

Conclusion

No one can say with any confidence how collection management will be understood a generation from now. The ideas offered in this paper are intended to help us face the exciting and bewildering challenges in the networked era. The terms *transformation* and *paradigm shift* are regularly heard in discussions on the future of libraries in a period of enormous technological, cultural, and institutional change. In the context of collection management, our challenge is to creatively reimagine our role in light of these rapid developments in scholarly communication, acquisitions activities, access and delivery issues, and innovation, while maintaining our core professional values of equity of access, intellectual freedom, and stewardship. We need to carefully examine our rapidly changing environment so we can demonstrate clear and compelling value to our patrons and to our institution as a whole. This is a fascinating and turbulent time to be a collection librarian.

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Notes on Operations

Letting Go

Closing a Branch Library of the Health Sciences Library System, University of Pittsburgh

By Leslie Czechowski, Renae Barger, Malgorzata Fort, and Gretchen Maxeiner

Closing a branch library is a complex and often a painful activity, but one that libraries frequently face in difficult economic times. This case study examines a project that closed a branch library in an academic health sciences library system. The authors describe the sequence of steps followed, challenges encountered, and solutions implemented to complete the project. The authors document lessons learned that can benefit other libraries faced with a similar situation.

In the fall of 2008, the administration of the Western Psychiatric Institute and Clinic (WPIC) informed the Health Sciences Library System (HSLS) at the University of Pittsburgh (Pitt) that it would have to make extensive budget cuts in the collection of its library, one of four libraries the HSLS manages. In early December, after a few months of planning for space and budget reductions, the WPIC administration notified the HSLS director that WPIC Library instead would close permanently at the end of the semester. The HSLS received no reasons for the decision. Some staff positions were terminated and others retained for a few months to aid in the disposition of the collection, which was planned for completion by the end of the spring. Begun in 1942, the WPIC Library had built a comprehensive collection in psychiatry and the behavioral sciences. The HSLS staff were devastated with the decision yet had no choice but to plan to dismantle this outstanding collection.

This paper is a case study on closing a departmental or branch library that is part of a larger academic library system. The library's collection was specialized, and the largest portion was unique within the system. This paper describes the planning phase, processes developed, activities, and results of the work. The authors, who served as project managers, document lessons learned that could benefit other libraries faced with a similar situation.

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Literature Review

Because the HSLS had so little time to plan for closure of the WPIC Library, project managers did not take the time to review the library science literature, but they would have benefitted from doing so. Many relevant articles on the subjects of moving libraries to different spaces, merging branch libraries into the main library, and closing libraries have been published. Two articles relate to merging libraries. Lessin's article, a more theoretical, historical discussion, is aimed at helping library managers guide decision-making; it is not a step-by-step discussion of the process.[1] His is a positive response to the potentially negative action of merging libraries. He reminds his readers that patrons may not be happy with such decisions, but the

electronic environment provides access to literature regardless of the physical location of materials, especially in a library that provides information in science, technology, and medicine.

The librarians at the Ebling Library at the University of Wisconsin-Madison knew two years beforehand that they would be merging three health science library collections into one.[2] They had the time to carefully plan for the move with input from staff throughout the libraries. They could take the time to reclassify one collection before the move, spend a year to perform a title-by-title assessment of the journal collections, and carefully mark shelves in the new building so that the moving company could know where to place the bound journals. The authors note the importance of communication to library staff and patrons as the move was taking place—a recurring theme in articles addressing moving, merging, or closing libraries.

At the Memorial University Medical Center in Savannah, Georgia, the library was moved at the recommendation of the librarian.[3] They had time to plan the new space to suit their needs, but did face some challenges with the actual move. Their experience highlights the fact that although each library's issues and challenges are unique, problems will necessarily arise when moving, merging, or closing a library. Croneis and Short present results of a survey regarding the addition, closing, or merging of branch libraries at Association of Research Libraries institutions.[4] The data relating to library closures parallels the activities at the HSLS: Collections were merged with other collections, vacated space was taken over by the academic department, and services were moved to another location.[5] Croneis and Short also note that the impact of electronic resources was significant in more than half of the responding institutions, a situation all too familiar in academic libraries in the twenty-first century.[6] Atkins and Kruger present an array of data concerning the management of large projects in libraries, including the moving of a library.[7] They note a lesson learned that reflects what other authors have stated. Staff, communication, and planning are vital components of large projects of any type.

Few articles discuss the actual closure of a library. Two older articles by Griffin and Sheridan discuss the disposition of an entire collection when a college closes.[8] Cohen describes the relocation of the Engineering Societies Library.[9] Pearlstein and Matarazzo's discussion of the closure of a corporate library resonates with the situation at the HSLS because the decision was made at the top, with no input from staff. However, they do not discuss the process of closing the library.[10] Davidson discusses moving a science library into the main library at Augustana College, an integration that was part of the planning for a new central library.[11]

Johnson's detailed article about closing a branch library on a university campus highlights many issues similar to those faced by staff at the HSLS.[12] The University of Minnesota Libraries (UML) had to close their branch library at the Museum of Natural History in 1992 because of budget constraints. They had numerous duplicates in the journal collections and transferred only unique titles to the recipient library. UML had to use existing staff, although they were able to hire a few extra staff members when the library realized the process could not be completed otherwise in the time available. Problems they faced included making decisions on the basis of available shelving space and reprocessing considerations. Johnson's article is too brief to include extensive details of their planning, processes, and results.

The article that describes the closing of the chemistry library at Louisiana State University (LSU) also presents many issues faced by the HSLS.[13] Staff at LSU had only one semester in which to plan and move the library and needed to find space in both the main library and storage for monographs and bound journals. Collection weeding was required. Both the HSLS and LSU had to plan for the integration of a portion of the specialized collection into the regular collection. Each library made different decisions because of unique circumstances. For example, LSU needed to reuse shelving and used their Facility Services staff and student workers to move materials. Armstrong notes that planning, cooperation, and efficiency were central to their success, as do the authors of the present paper.

Background

In most respects, the HSLS is an independent library system at Pitt. It shares the same Voyager integrated library system (ILS) and cooperates in purchases of numerous electronic resources with other university libraries. The director of the HSLS reports to the senior vice chancellor for the health sciences, a separate reporting structure from the other Pitt libraries. The HSLS has fifty-four staff (twenty-three faculty librarians and thirty-one support staff). Technical services are centralized in Falk Library. The libraries have 266,645 print volumes shelved in the libraries with an additional 140,299 volumes in off-site storage. The collection contains 406,924 nonprint materials, 437 print journals, and 199,857 print monographs, and it provides access to 2,838 e-books. HSLS subscribes to ninety databases and more than 4,000 electronic journals.

At the time of the closing, the HSLS had four libraries. The main library, Falk Library, serves the academic needs of the six schools of the health sciences at Pitt and clinical needs of a group of hospitals contiguous to Pitt's main campus. The WPIC

Library was the other academic/clinical library, located across the street from Falk and connected by an underground tunnel (a situation that proved invaluable during the move). Two of the University of Pittsburgh Medical Center (UPMC) hospitals have libraries that are part of the HSLS: Children's Hospital of Pittsburgh of UPMC (CHP) and UPMC Shadyside Hospital. UPMC had eighteen facilities at that time; the HSLS provides access to licensed electronic resources for all of UPMC.

WPIC Library became part of the HSLS in 1995. Since its formation, it had been an independent library with a general academic and medical collection and a focus on psychiatric literature and related specialties. Because of differing cataloging practices before WPIC Library joined the HSLS, technical services staff were never able to get an accurate tally of exact numbers in the collection. However, before the closure, as far as the authors could ascertain, WPIC Library contained 44,597 monographs, 4,627 audiovisual items, and 1,476 periodical titles (with approximately 29,000 bound volumes). Although a majority of the collection was unique within HSLS, some of the collection was duplicated in other HSLS libraries. The WPIC Library had general reference titles (dictionaries and directories), general medical textbooks (for example, *Harrison's Principles of Internal Medicine*), numerous journals such as the *New England Journal of Medicine* and *Science*, and monographs in related disciplines such as psychology and education. In addition, some part of the collection overlapped with collections in other university libraries. One difference between the WPIC Library and the rest of the HSLS was that the WPIC Library had used the National Library of Medicine (NLM) Classification since its inception while all other HSLS libraries use the Library of Congress Classification.

Planning Process

Planning began immediately upon learning about the decision to close. The planning was initiated and accomplished by the authors of this paper, who served as managers of the project. They were the assistant director for Collections and Technical Services, head of Access Services, head of Technical Services, and the cataloging librarian. Initial policies were based on

- the desire to retain the core of the psychiatric collection;
- limited space in the main HSLS library, Falk Library, and in the off-site storage facility;
- the need to discard items duplicated in other HSLS libraries (and in some cases at other Pitt libraries); and
- limited time in which to complete the project.

Major decisions at this point guided the authors' work during the project. Among other issues, they decided to

- refrain from reclassifying any materials except when absolutely necessary;
- avoid reprocessing (new spine labels, for example);
- tattle-tape the books that would move to Falk Library (the two libraries used different security systems); and
- refrain from scanning barcodes of books packed for transfer to off-site storage.

In early January 2009, the HSLS executive committee approved the policies for moving the WPIC collections (appendix A). The HSLS had complete latitude in making decisions regarding the collection, and there was surprisingly little outcry from faculty to influence policies.

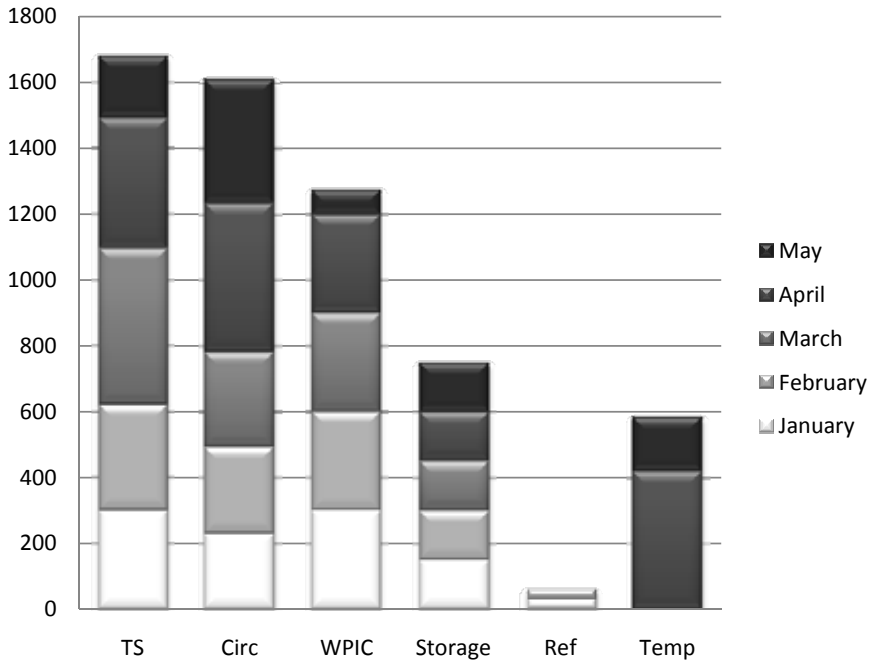
The discrete sections of the collection (audiovisual, reference, consumer health, circulating, periodical, and historical) were placed in priority order for moving on the basis of use as reported by the WPIC Library staff, availability of space in Falk Library, and complexity of integration. The project managers created a timeline for the project (appendix B), revising it during the process. Although the HSLS originally had agreed with the plan of the WPIC Library administration to finish by the end of March, other HSLS projects were in place that also required the work of the same HSLS staff. During this period the HSLS also was faced with the move of the CHP Library to a new building and the temporary move of Falk Library's rare book collection because of the installation of a new heating, ventilation and air conditioning system. A new deadline of May was arranged, allowing approximately five months for the project.

Several key decisions proved to be invaluable:

- A project team was created by the HSLS executive committee that included the four planning librarians and other staff who would be involved: Falk circulation staff, serials' cataloging staff, and the WPIC Library staff that were retained temporarily. The charge to the project team was to plan for and execute the move of the WPIC materials as quickly as possible.
- The team met weekly to assess progress, discuss problems and issues that had arisen, and plan for the coming week's work. This proved to be important because project team members were working on different portions of the collection simultaneously. The work of the cataloger, for example, directly affected the work to be done by the WPIC Library staff in the coming week.
- The project manager made minutes of each meeting available

to all of the HSLS so that staff—especially in public services—would have up-to-date information about the location of materials.

- The HSLS document delivery services maintained access to the WPIC print collection. The HSLS normally charges a fee for document delivery, but because HSLS patrons were being inconvenienced by the lack of direct access, the HSLS instituted a temporary procedure to deliver books and article copies from the WPIC collection to HSLS patrons at no charge. During the first four months of the project, the service transferred 191 books from the WPIC Library to another HSLS library for patron use, and scanned and delivered 169 articles to patrons electronically. Only one request had to be ordered via interlibrary loan because it could not be easily located on the WPIC shelves. All requests were filled within two days.



TS: Technical Services staff; **Circ**: Circulation staff; **WPIC**: WPIC library staff retained for the project; **Storage**: Staff at the off-site storage facility; **Ref**: Reference staff; **Temp**: Temporary staff

Figure 1. Staff Time in Hours

Staffing

As the project managers started this project, they were able to pull staff members in many departments and facilities away from their regular duties to assist with the work. Circulation staff and a staff member in reference services helped by searching the catalog to determine whether copies of WPIC titles were available elsewhere at Pitt. The WPIC administration agreed to provide funding for staff during the transition period, so the HSLS was able to retain two WPIC Library staff members for most of the project and add extra student workers. A former WPIC Library reference librarian and book selector who had been transferred to Falk Library consulted with the project team throughout the project. Regular staff in Technical Services, Circulation, Document Delivery, and the off-site storage facility put aside regular duties to do the work of the move, and other staff not directly involved had some responsibilities shifted to provide release time for dedicated project members. Finally, the budget allowed the HSLS to hire temporary workers to do the final move and tattle-tape of WPIC books and journals being transferred to Falk Library.

The involvement of individual staff members fluctuated depending on where the project team was focused at a particular time. With monographs, for example, the Technical Services staff initiated the work by creating lists of targeted segments of the collection and identifying the disposition of the items; WPIC Library staff, Falk Library circulation staff, and students packed and marked books; off-site storage staff received books sent to storage; and cataloging staff updated location information in the ILS. See figure 1 for the amount of time spent by staff in various departments. The table illustrates the amount of time (815 days or more than 6,000 hours) devoted by five departments and the temporary workers. The largest contributions are the equivalent of 209 days (1,672 hours) by Technical Services and 200 days (1,600 hours) by Circulation staff, followed by carry-over WPIC staff, storage staff, and temporary staff. Reference staff had very limited involvement—only three days (26 hours). At first, project leaders were disappointed that the budget was insufficient to hire commercial movers to transfer materials to Falk. However, the HSLS was able to hire three temporary staff who, perhaps because they were recommended by the HSLS staff and had some knowledge of libraries, proved to be excellent workers. They worked during off hours when the elevators and corridors between libraries were less busy.

Because moving books was tedious, the temporary staff made competitive games of moving the books; they did it quickly, accurately, and with some level of entertainment.

Audiovisual Collection

The WPIC Library had amassed an impressive variety of audiovisual materials, including many unique items, such as recordings of lectures and conferences sponsored by the institute. Some types of materials were used more than others, so the project team members broke down the collection by medium and assigned priorities for attention accordingly. The team quickly learned that that the way in which data had been treated in the ILS affected decision-making. In this case, all WPIC audiovisual materials had a single location code, so making global changes in data in the ILS for portions of this collection was challenging. The solution was to scan sets of barcodes and then process those in the ILS.

The top priority was the WPIC videocassette collection, which was both large and heavily used. An outdated slide collection was discarded to create a separate space for these in Falk Library, thus they did not have to be integrated immediatlely into the Falk audiovisual collection. Unfortunately, this space is outside the public area, so library staff must retrieve videos for patrons. However imperfect the solution, it bought time. The HSLS was able to postpone the reclassification of the WPIC videotapes (which would be necessary in order to interfile them into the Falk collection) yet still make them available for patrons without delay.

The collection of DVDs and CDs also was heavily used but much smaller. This group was reclassified, reprocessed, and incorporated into appropriate sections of the Falk audiovisual collection. Finally, audiocassettes were moved to storage and made temporarily unavailable pending evaluation. A future project will identify which audiocassettes are historically significant and should be migrated to different media; those for which no demand exists will be discarded. Availability of funding for reformatting also will be a consideration.

Consumer Health and Reference Collections

Consumer health librarians at two other HSLS libraries selected 165 WPIC monographs on consumer health to be reprocessed for their collections. Books not selected were withdrawn from the catalog and left on the shelf. Staff from the Carnegie Public Library of Pittsburgh were invited to take any of the remaining consumer health books for addition to its collection.

The reference collection was to be moved to Falk Library. Reference services for WPIC patrons had already been transferred to Falk, so moving the collection was a priority. A separate shelving unit was installed in the Falk reference area so that the WPIC reference collection could be kept apart from the Falk materials. This decision again eliminated the immediate need for reclassifying the WPIC materials. Librarians also believed a distinct psychiatric reference collection would ease the transition for staff and patrons in the short term. Perhaps of most importance, project staff did not have the time to select, reclassify, and integrate the psychiatric reference books into the Falk collection. Because of the limited amount of space available in the Falk reference area, only a portion of the WPIC reference collection could move as reference materials. The former WPIC selector recommended which psychiatry titles should move to Falk Library; the selector for the Falk reference collection and the assistant director for Collections and Technical Services decided which of the remaining titles would be moved into the circulating collection or withdrawn.

Circulating Collection

The circulating monographs proved to be one of the most challenging parts of the collection. This was the largest segment of the WPIC Library, and to retain the most important books the authors employed a number of strategies, some successful and some not. To narrow the circulating collection to its core materials, several types of books were targeted for transfer or removal: duplicates (1,500 titles), foreign language (866), previous editions (2,727), and books with zero circulation (14,116 books published before the year 2000 that had never circulated). Reports were run from the ILS on each of these groups of books, and, to keep staff as busy as possible, the project managers tried to work on them simultaneously. During the entire monograph (and bound journal) project, all withdrawn items were processed in the ILS and physically marked as discards, including a black "X" across the spine label for easy recognition; they remained on the shelves in their original spot.

First, the project managers decided to withdraw the majority of the books that were duplicated within the WPIC and in other HSLS libraries. The HSLS did not have space for all of the WPIC books, and withdrawing duplicates was logical. Staff started this project in October, even before the decision to close the WPIC library was made. The project was completed by late January.

At the same time, the foreign language books were being evaluated. Because the HSLS collection policies state that books in languages other than English are not collected, the staff decided to withdraw foreign language books that are held in more than six libraries in the eastern part of the United States. Staff assumed that if a

patron needed one, it could be easily obtained via interlibrary loan. The foreign language books that were retained because of their relative uniqueness were transferred to the HSLS off-site storage in February.

Staff started pulling earlier editions of standard texts for removal to off-site storage because initial projections suggested that Falk Library would not have space for them. However, the identification of early editions in the ILS proved to be unexpectedly time consuming. As the end of February drew near, staff discontinued this project, retaining the earlier editions with the collection to be moved to Falk. The largest group of circulating materials—books with zero circulation—was divided into two treatments: Those held in other Pitt libraries would be withdrawn, and the rest would go to off-site storage.

As the staff began withdrawing books with zero circulation that were held at other university libraries, a former WPIC librarian expressed concern about breaking up this unique psychiatric collection; there are few American libraries with such a rich collection. The HSLS executive committee reconsidered on the recommendation of the project managers and adopted a revised policy stating that the HSLS would withdraw books with zero circulation in all NLM classifications except for WM (Psychiatry). The psychiatric books would be retained, even if a Pitt library also held a copy.

As staff worked with the monographs, the project managers questioned whether such a careful, title-by-title analysis of the monographs was wise. The plan had been to preserve the best of the collection given space constraints, and time to do so was provided. But was it a good use of time? The project managers ultimately decided that it was because the core psychiatric literature that had made this such a rich collection was retained. Other libraries may not have the space and time to follow this course.

Keeping all of the withdrawn items in order on the shelves left open the option of offering the books to other libraries or used book vendors after the project was completed. By the end, however, the press of other work—set aside while staff focused on this project—made returning to the WPIC collection impossible. Thus the remaining withdrawn books (and journals and shelving) were given by the WPIC administration to a company specializing in collecting and recycling used library materials for other libraries. The portion of the circulating collection to be retained was moved to an empty, distinct section of shelving in Falk Library, space made available because of a recent move of older bound journals to storage. The temporary workers and library circulation staff moved books from the WPIC to Falk Library cart-by-cart through elevators and tunnels. The books are now designated as the Psychiatry Collection in Falk Library, and will remain separate until time and space are available to reclassify and integrate them into the rest of the Falk circulating collection.

Periodicals

The complex procedure of evaluating and moving the bound periodicals took more than four months. The driving force in the decisions regarding the bound periodicals was the space available in Falk Library. Circulation staff carefully measured existing shelves to determine how many volumes could be added to the Falk collection, and then the head of Technical Services decided which volumes should be moved. The periodical holdings were evaluated in two different groups: titles duplicated within the HSLS and titles unique to the HSLS. A goal was to eliminate the duplication of holdings between the HSLS libraries, so duplicate volumes in the first group were withdrawn. Unique titles were assessed to trim the collection further by removing newsletters, some periodicals that were out of scope (mainly nonpsychiatric titles in psychology, education, and medicine), and periodicals with scattered holdings or duplicates somewhere else on campus.

Project managers decided to allow a certain level of divergence from usual HSLS collection policies when planning the merge of the Falk and WPIC periodical collections. For example, Falk print periodicals published before 1990 are kept in off-site storage, while periodicals published since 1991 are kept on site. However, for WPIC periodicals, staff followed the more restrictive retention policies used by the HSLS hospital libraries, which mandate sending to off-site storage all volumes up to the current one if the title is available online. This decision made it possible to drastically shrink the number of volumes that needed to be incorporated into the Falk collection. Also, although the HSLS policies call for collecting materials in English only, staff kept foreign language periodicals if they were not available elsewhere in the United States. The end result of these decisions was that 24 percent of the periodicals were slated for full withdrawal and 17 percent were partially discarded (i.e., the HSLS still holds this periodical, but duplicate volumes were removed).

Once the head of Technical Services completed the evaluation, and the decisions were noted on the periodical lists generated from the ILS, the WPIC Library staff started marking the volumes on shelves to indicate those to be discarded, those to be sent to off-site storage, and those to be moved to Falk Library. Technical Services staff began to update the data in the ILS, and Circulation staff prepared to shift Falk periodicals to accommodate the WPIC volumes about to be integrated. However, this proved to be more complicated than expected. There was little room for error on the available shelving, and no

Table 1. WPIC Materials Withdrawn, Moved to Falk, or Transferred to Off-Site Storage

WPIC Materials by Type	Items in Collection 12/31/08	Items Withdrawn	Items Moved to Falk (or other HSLS libraries)	Items Sent to Off-Site Storage
Videocassettes	2,070	0	2,070	0
DVDs & CDs	45	0	45	0
Audiotapes	2512	1278	1234	0
Reference books	1687	416	1220	51
Consumer collection	682	517	165	0
Circulating books	42,228	8,207	28,074	5,947
Periodicals: Titles*	1,476	361	314	925
Periodicals: Bound volumes	29,000**	number not collected	10,151**	14,022**
Historical materials	Unknown	0	7 boxes	0

* Titles were sent to more than one location
** Estimated numbers

one wanted to shift periodical volumes more than once. The biggest challenge at this stage of the project was stating exactly where and how much space was needed on the periodical shelves, because this would only be known after all of the updates to the ILS were completed. Unfortunately, time constraints forced Circulation staff to start shifting periodicals before project staff had the exact numbers. Thus, although it required an inefficient workflow in Technical Services, in the interests of project efficiency the head of Technical Services did extra work to provide data on segments of the periodicals so that shifting could begin. Several activities occurred simultaneously: Circulation staff began to shift Falk bound periodicals, Technical Services staff changed holdings data for the WPIC periodicals, temporary staff tattle-taped and then moved the WPIC periodicals to Falk Library, the WPIC Library staff packed periodicals to send to storage, and staff at the off-site storage facility received and processed materials sent there. The incredible level of understanding and cooperation between the staff and librarians allowed this to happen with a surprisingly small amount of angst.

As with the monographic collections, withdrawn bound periodicals were left on the WPIC shelves for later decisions about disposition. Because the HSLS wanted to support the NLM's recently created Journal Donation Program (www.cf.nlm.nih.gov/jdonate/index.cfm), project staff allocated time to offer unwanted volumes to the NLM (and other Pitt libraries) in order to fill gaps in their collections. Given the importance of the WPIC periodicals collection, project managers believed the HSLS had an obligation to the library community to dispose of materials in the best possible way, even if it took more time.

In retrospect, one might question the decision to integrate the WPIC periodical collection into the Falk collection rather than keeping it separate (as was done with the monographs) or moving it to off-site storage. The project was certainly difficult and time consuming. However, the staff were available and project managers arranged for the additional time to do so. Since the HSLS periodicals are not classified, there was no added challenge of reclassifying materials. The HSLS librarians believe that patrons will be better served with an integrated collection but recognize the luxury of sufficient staff and time to make this work.

Historical Materials

Project staff were aware that the WPIC Library had been a careful custodian of the institution's history and contained a collection of historical materials that would need special treatment by the HSLS. In addition, as the cataloging librarian was withdrawing monographs, she noticed numerous books published by or about the WPIC in the general collection that had not been recognized as items to be retained. Staff were able to rescue most of these, transferring them to a special collections area. Additionally, during final walkthroughs of the library, project managers found several boxes of historically important newsletters, photographs, departmental minutes, and other items that needed to be moved to Falk Library. The project managers had not realized valuable uncataloged materials might be stored in filing cabinets and closets.

Future Projects

Project staff moved all of the materials to be retained out of the WPIC Library in the allotted time. Table 1 presents final numbers of items withdrawn,

transferred to storage, and moved to Falk Library (and other HSLS libraries). However, many projects remain that will need to be addressed in the coming months and years. They include the following:

- Reclassifying the WPIC reference collection and integrating the books with the Falk reference collection.
- Reclassifying the WPIC circulating collection and integrating the books into the Falk collection. (However, the two collections are now on separate floors of the library, and combining the two will necessitate major space reconfiguration.)
- Weeding the WPIC videocassette collection, reclassifying those retained, and intershelving them with the Falk collection.
- Assessing the audiocassette collection for retention.
- Processing the historical materials.

Lessons Learned

Throughout the project, the project managers made note of processes that seemed to work well and those that did not. They continually analyzed workflows and, at the end of the project, discussed specific parts that did not work well and what might have been done differently. The first area of concern was the entire monograph project. As staff worked simultaneously on the four groups of monographs, the lists began to overlap. For example, some of the earlier editions were also duplicates. This created a problem because conflicting treatments could be dictated for a single item; tracking what treatment may already have been taken for an item when it appeared on multiple lists was difficult. Sorting through these issues required the intervention of a knowledgeable staff member. At that point, there was no time for such interventions. The project managers realized that because all the lists were run at the beginning of the project (duplicates, foreign language titles, earlier editions, and zero circulation titles), such overlaps were inevitable. The reports were run simultaneously to get estimates about how much off-site storage space would be needed to accommodate these books, but the project managers soon learned that they should have either run reports one at a time (to avoid overlaps in the titles included) or tried to consolidate the four monograph projects into one. Most certainly the duplicates should have been withdrawn as the final phase of the monograph project because so many of the other groups included duplicates. All of this resulted in unintentional withdrawals. In the case of duplicate books within the WPIC Library, the best physical copy was retained; yet, if that copy had not circulated, it would appear on the zero-circulation list, resulting in the withdrawal of both copies. However, when focusing on the monograph collection, one of the drivers in decision-making was the attempt to keep available staff working as quickly as possible to meet the deadline. Therefore staff were not able to rescue these unintentional withdrawals.

In retrospect, leaving withdrawn books on the shelves may not have been a wise choice. Project managers were trying to minimize the amount of time spent handling the books, but as staff worked through the various portions of the monograph collections, books were stamped "withdrawn" and the spine labels crossed out in separate portions of the project; books may have been inadvertently marked as withdrawals. The withdrawn books on the shelves complicated the move of books bound for Falk. Would it have been better to shift withdrawn books to a corner of the library where they would be out of the way and would not complicate successive parts of the project? The authors do not have an answer to this, but they wish they had thought this through more carefully in the beginning.

Feeling pressured to complete the project quickly, project managers made decisions to save time. For example, staff did not scan the barcodes of books that were packed for transfer to off-site storage, but they then could not locate books when they were needed; staff were not sure if they were in boxes or simply missing. This was especially problematic when dealing with the multiple groups of monograph projects. Letting time be the sole reason for making such decisions may not have been wise.

Because so many historical materials and photographs were discovered at the end of the project, the project managers learned the importance of investigating all materials in the library regardless of where they were stored. A thorough walk-through of the entire library by the task force at the beginning of the project would have allowed more careful planning for the uncataloged materials found at the end of the project.

Recommendations

Although this was a painful, time-consuming, and exhausting task, the project managers consider it successful. The work validates the lessons learned that were reported in Atkins and Kruger's survey, *Managing Large Projects*: "Human beings are your most important resource. . . . Communicate! Communicate! Communicate! . . . There's no substitute for formal and deliberate planning."[14] What did the authors learn that might benefit staff in other libraries faced with a similar situation?

- Detailed planning is essential. Carefully thinking through complicated projects in advance will likely save hours and anguish in the months ahead.
- Collaboration is key. Involve

staff members from across library departments to ensure smooth hand-offs and coordinated workflow.
- Include librarians and staff from the library being closed. Their knowledge about user preferences, locations of materials, and other unquantifiable details can be invaluable.
- Maintain a steady flow of information regarding the progress of the move to all library staff.
- Be willing to change established library policies if needed to facilitate patrons' access to materials.
- The project team should take a careful, detailed tour of the closing facility to familiarize themselves with the collections, identify potential trouble spots, and make sure they locate all materials before a plan is finalized.
- When pulling data from the ILS, think about how people will use the data to do the work. Do they need barcodes or reports sorted by call number, for example? Something as simple as report formatting can affect the efficiency of a workflow.
- Understand the nature of the data in the ILS (such as the specificity of location codes), which can affect workflow decisions. Understand the capabilities of the ILS regarding global data changes.
- Take the time to make the best decisions possible, but do not let time be the sole reason for making a decision (if possible).
- Using the number of available staff to dictate the workflow rather than using a logical progression of activities may not be a wise decision.
- Space is the ultimate determinant for making decisions.
- Projects that could not be completed during the initial phase should be documented to set priorities for special projects in the future.

Conclusion

In the current economic climate and with the ever-increasing reliance on electronic resources, more and more academic institutions may face closure or consolidation of libraries. Librarians are already seeing evidence of this. For example, the Physics Library at Syracuse University closed in May 2008, and the Library and Information Science Library at the University of Illinois at Urbana–Champaign closed in May 2009.[15] The lessons learned by the HSLS librarians may benefit others in similar situations. Planning is essential, even if timing is tight. Assessing the situation with regard to budget, staff, and space and time constraints is vital. Trying to determine in advance the best processes will help lead to a successful result. Librarians know the value of having a disaster response plan for their institution. Now may be the time to develop an understanding of the issues librarians would face if given a mandate to close—to avoid a potential disaster of a different kind.

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Appendix A. Policies for Move of WPIC Collections

- Establish a task force [project team] to include all staff involved with WPIC collection. They will meet weekly to assess progress and move forward in a coordinated manner. Not everyone may need to attend each week.
- Tattle tape: both the WPIC reference and circulating collections will be tattle-taped during the move to Falk.
- No spine labels will be changed except as noted in Work Schedule.
- No reclassification will be done except as noted in Work Schedule.
- Decisions need to be finalized regarding where WPIC monographs and journals will be shelved in Falk.
- We will not identify duplicates between HSLS and other University [of Pittsburgh] libraries. The one exception is zero-hit books. Zero-hit books that are also held by other libraries will be withdrawn (not moved to off-site storage).
- Our collection policy states that we collect only English language materials. We will analyze foreign language monographs in the WPIC collection (i.e., circulation, historic value). We will withdraw foreign language monographs that have not been extensively used nor are of high value.
- WPIC discards. We will retain withdrawn materials in the library. After all other materials have been moved, we will contact book sellers, other libraries, etc. to take those that they want. We prefer to sell materials, if possible.
- Historical materials. We should retain some duplicates. There may be other history of medicine libraries who might take some before we offer them for sale or to other libraries in general.
- WPIC photographs. We will remove from frames and add to our special collections materials in Falk.
- New psychiatric monographs that are purchased will be added to the Falk collection. No new materials will be added to the WPIC monograph collection.
- Weekly updates will be sent to all HSLS staff regarding details and progress of the move.

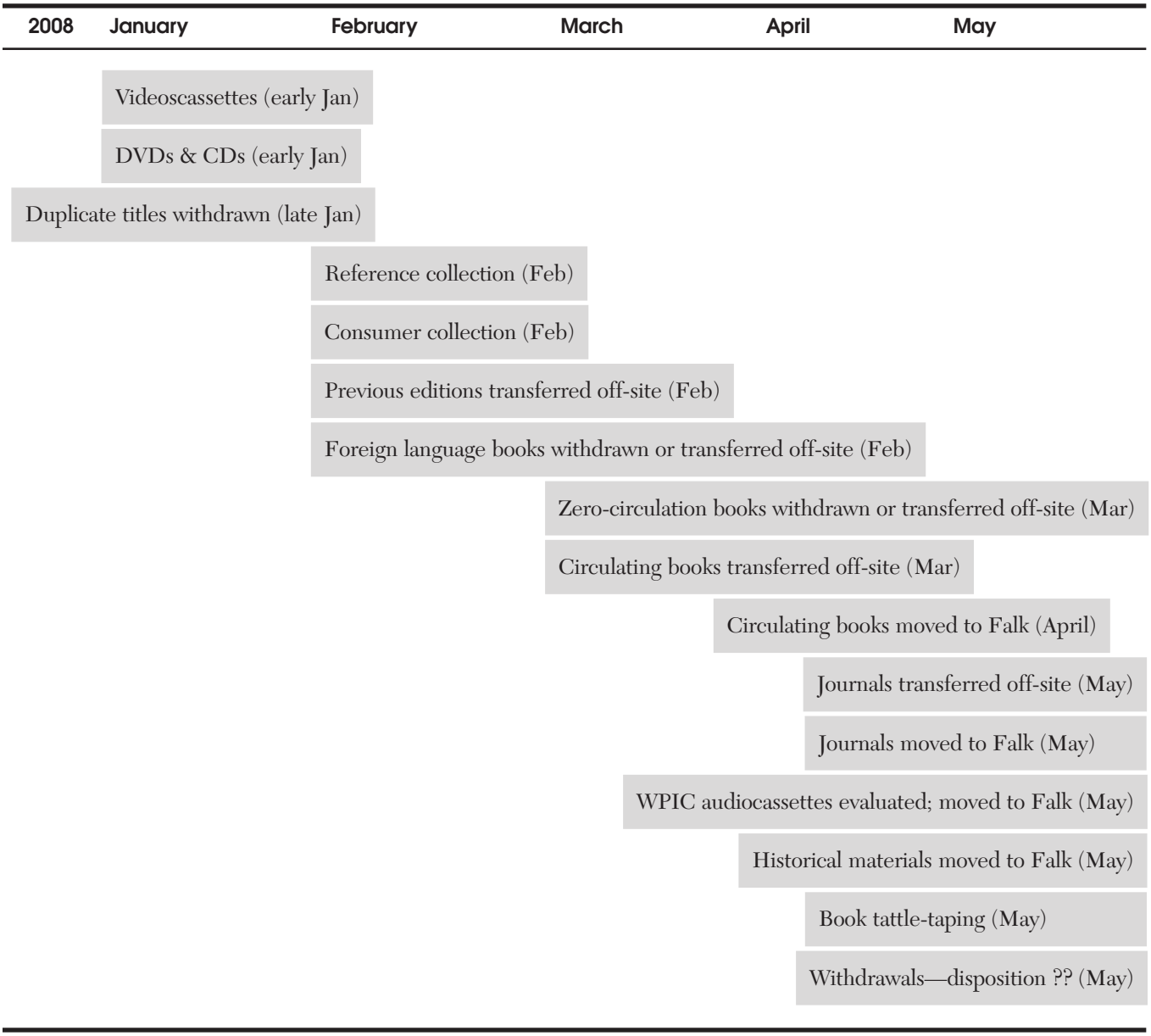
Journals

- Unique WPIC journals
  - We will withdraw
    - nonpsychiatric journals
    - foreign language journals (after evaluating for use and historical value)
    - journals with scattered holdings
    - single issues
    - newsletters
  - Those journals we withdraw will be offered to other University [of Pittsburgh] libraries, then to NLM. If neither wants them, we will offer to other area libraries. We will not take the time to assess if libraries already have the materials. They would have to pack and pickup and pay for postage (NLM).
  - The head of Technical Services has the leeway to send journals with publication dates in the 1990s to off-site storage if doing so would alleviate time-consuming holdings work by Technical Services staff (even if this "violates" our stated policies regarding location of journals).
- Duplicate WPIC journals
  - Retain those issues and volumes that will fill gaps in current holdings
  - Withdraw true duplicates. We want to offer to other University [of Pittsburgh] libraries, NLM, etc. as above.
- Unique print WPIC journals for which we have online access. We will transfer to off-site for archival purposes.
- We will integrate current WPIC print subscriptions into Falk.
- We will accept donations of print journals per our gift policy for journals.
- We will physically integrate the bound WPIC journals with journals in Falk.

Reviewed and accepted by HSLS Executive Committee, January 8, 2009.

Appendix B. Planning Timeline 2009

Note: Dates in parentheses reflect the time of completion for each phase.



Notes on Operations

Mass Management of E-Book Catalog Records

Approaches, Challenges, and Solutions

By Annie Wu and Anne M. Mitchell

Electronic book collections in libraries have grown dramatically over the last decade. A great diversity of providers, service models, and content types exist today, presenting a variety of challenges for cataloging and catalog maintenance. Many libraries rely on external data providers to supply bibliographic records for electronic books, but cataloging guidance has focused primarily on rules and standards for individual records rather than data management at the collection level. This paper discusses the challenges, decisions, and priorities that have evolved around cataloging electronic books at a mid-size academic library, the University of Houston Libraries. The authors illustrate the various issues raised by vendor-supplied records and the impact of new guidelines for provider-neutral records for electronic monographs. They also describe workflow for batch cataloging using the MarcEdit utility, address ongoing maintenance of records and record sets, and suggest future directions for large-scale management of electronic books.

E-books emerged in 1971 with Michael Hart's Project Gutenberg and started to capture widespread attention in 1998 with the introduction of two e-book reading devices, the Rocket eBook and Softbook.[1] In the intervening decade, Google has propelled e-books into the mainstream, a new generation of mobile devices has improved e-book readability and convenience, and content providers have offered libraries an increasingly diverse array of electronic products and service models. With e-book purchasing on the rise, many libraries have elected to make e-books available via their online catalogs. A 2007 literature survey by Belanger indicated a widespread consensus in favor of integrating e-book records into the library catalog.[2]

According to a recent National Information Standards Organization white paper on book metadata workflow, many libraries rely on vendor-supplied cataloging for their e-book collections.[3] Despite this widespread practice, cataloging guidance has continued to focus on the content of individual fields and records rather than the logistics of large-scale record handling. In the summer of 2009, the Program for Cooperative Cataloging (PCC) recommended and implemented a provider-neutral record standard for electronic monographs (e-monographs).[4] The new policy represents a significant step toward the standardization of e-book cataloging practices, but it does not fully address how best to integrate large record sets from multiple providers. Practical challenges include editing bibliographic data in batch, merging records for duplicate copies, scheduling and tracking updates, and building and sustaining staff knowledge and skills to carry out these functions.

This paper describes the complexity of the e-book landscape in a research library, looking in particular at the University of Houston Libraries (UHL) and its intensive use of vendor-supplied cataloging for its collection of nearly 400,000 e-books. The paper also details UHL's current approach to e-book cataloging,

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including local batch cataloging decisions, techniques for using MarcEdit (an open source MARC utility), use of the SerialsSolutions MARC service for e-books, and efforts to coordinate the batch record management process. The authors discuss the impact of the new PCC guidelines on existing practices and highlight issues of ongoing concern that offer potential for future exploration by the e-resource cataloging community.

Literature Review

E-book collections are growing, and many libraries are integrating e-book records into their online catalogs for ease of access. Given the large size of many e-book packages, libraries often use vendor-supplied record sets to expedite access. A review of the literature reveals that while numerous publications have addressed issues of access and bibliographic control of e-journals, little research has been done in the area of e-book cataloging, particularly for mass cataloging and management of vendor-provided e-book records. Only a few publications discuss cataloging rules, case studies, or survey results pertaining to e-books.

In a 2006 paper, Sanchez and colleagues shared techniques for batch editing and maintenance processing e-book records using nontraditional editing utilities.[5] The authors identified problems in bibliographic records provided by NetLibrary and described efficient record-editing methods to clean up NetLibrary cataloging records. The paper documented procedures for error resolution using a variety of tools, including MarcEdit, Microsoft Word macros, and Microsoft Excel spreadsheets. Sanchez and colleagues pointed out the need to establish workflows and "create procedures that detail a step-by-step approach to editing and revision tasks."[6]

Bothmann discussed e-books as unique manifestations in his guidelines for e-book cataloging.[7] His article described in detail the functional elements of cataloging e-books using the 2002 revision of the *Anglo-American Cataloguing Rules* (*AACR2*). He pointed out those areas and fields to which catalogers should pay special attention when cataloging an e-book, including control fields, variable data fields, uniform titles, title information, edition information, type and extent of the resource, publication and distribution information, physical description, series statement, notes, and subject analysis. Bothmann recommended that catalogers make good use of cataloging rules and keep up-to-date with current rules.

Martin addressed e-book cataloging questions, such as where e-book records should come from, how to process them, how to handle holdings, what changes to make to vendor-provided records, how to maintain e-book records, and whether to add holdings to OCLC.[8] She raised concerns particularly about the limitations of applying the electronic-reproduction model when using vendor-provided records in e-book cataloging. According to Martin, e-book cataloging "is not a simple task and requires careful analysis and thoughtful decisions."[9]

Simpson, Lundgren, and Barr from the University of Florida Smathers Libraries (UFL) described efforts to enhance access to print and electronic versions of the same title within the catalog by linking corresponding manifestations.[10] Using a local loader, Excel spreadsheets, and macros, their *Functional Requirements for Bibliographic Records* (*FRBR*) conceptual project employed a highly automated, multistep process to identify, match, and link netLibrary e-book records with their print counterpart records. This linking model helped users to effectively search and retrieve both versions of the same title by taking advantage of keyword searching of the table of contents data acquired by UFL in 1990 to enrich records for print books. According to Simpson, Lundgren, and Barr, this FRBRizing model can be applied to link records of other related materials. The authors recommended that catalogers "go beyond their traditional functions, explore new options in technology, and communicate their ideas to those who can implement them and to those who benefit from the outcome."[11]

Belanger's 2006 survey examined the cataloging practices of thirty higher education libraries in the United Kingdom.[12] The analysis of the survey results shows that most of the libraries cataloged e-books from large subscription collections. Five libraries cataloged individual e-books while only four libraries cataloged free e-books. Only two libraries had not cataloged e-books at all. Twenty-three of the thirty libraries used separate records for print and electronic versions of the same title. The survey also indicated that very few universities' online public access catalogs (OPACs) allowed retrieval of e-books by limiting the search to the e-books format. Belanger concluded that "much work remains to be done in order to ensure easy access to electronic books via the library OPAC."[13]

E-Book Collections and Acquisitions

Writing in 2000, Hawkins noted that "the ebook market is in a state of extreme flux and is changing daily."[14] The same is still true a decade later. At every level of the e-book landscape, "fragmentation, of technical platform, of format, of business model . . . complicate service provision."[15] E-book providers regularly emerge and disappear as publishers and content aggregators change hands. As the e-resource marketplace has matured, a wide variety of monographic e-content has become available, including reference works, academic and technical books,

and literary and primary source content. The means of obtaining access to e-books are similarly diverse, including single-title purchasing through traditional fulfillment services, publisher and aggregator packages, and user-driven acquisition. This complexity is a challenge for catalogers not because the resources are difficult to catalog, but because the workflow is difficult to manage efficiently. E-book collections are volatile, and the bibliographic data that support them come from many places and follow few standards.

Models for Acquiring E-Books

E-books may be acquired through many different models, both singly and in batch, and each model has different implications for cataloging and bibliographic record management. Like print books, e-books can be acquired on an individual basis through the library's fulfillment vendors. While the workflow for single titles is closely akin to traditional firm-order purchasing, the challenge for cataloging is to know where new resources are in the workflow process and who has responsibility for them at any given moment. UHL has been apprehensive about adopting single-title purchasing for e-books, fearing that the effort needed to track individual titles from request to availability will result in an enormous per-title burden on technical services staff.

Individual e-book purchases are a new area for UHL. Until recently, e-books and other monographic e-content were purchased exclusively in multititle packages. Static packages, such as UHL's several netLibrary collections, are the easiest to manage because records can be loaded once and left alone. UHL subscribes to several literature and primary source packages that, though numerous, are also relatively easy to manage because updates are infrequent and additive; resources are rarely dropped from this type of package. The most challenging packages to manage are those with continually changing content, such as the Safari Tech Books current collection, which provides access to technology titles published in the latest three years. Additions and deletions must be handled on a monthly basis, a process that can quickly become onerous if the library subscribes to many such collections. A secondary infrastructure, such as an electronic resource management (ERM) system, spreadsheet, wiki, or a combination of these, may be necessary to help the library keep track of what has been loaded and when.

Patron-driven purchasing is seldom discussed as a cataloging issue, but it has implications for cataloging operations because it straddles individual and batch record management. Patron-driven e-book acquisition entails providing access to numerous e-books through the catalog and other access points but purchasing only those titles that exceed a predetermined threshold of use. This approach requires a kind of reverse cataloging process wherein a large volume of records are loaded initially and the purchased records are individually marked for retention. If user selections reach the library's spending cap for the package, the remaining records may be suppressed or removed. Clear identification of the set of available records and the ability to distinguish those titles that have been purchased from those to be removed are of paramount concern for packages open to use-driven acquisition.

Types of Monographic E-Content

Ease of bibliographic management is largely a function of the size, nature, and volatility of the package. Among the many e-books that academic libraries collect, certain types of content raise particular data management issues. The following four types of e-book collections are derived from the e-book scenarios by O'Leary.[16]

- *Technical and professional books* (e.g., ENGnetBASE, Safari Books Online, Digital Engineering Library) obsolesce rapidly, and older titles are typically replaced at intervals with similar titles or new editions. Because of the technical nature of the content, date and edition information are highly significant for users.
- *Reference books* (e.g., Credo Reference, Oxford Reference Online, Sage eReference) may be available individually or in small packages. Like technical and professional books, reference packages are subject to frequent updates as new editions are issued. Some online reference works behave like integrating resources, updating continuously over time.
- *Literature and primary source packages* (e.g., Chadwyck–Healey databases, Alexander Street Press databases) are relatively static, but they are likely to contain nonbook monographic content that requires slightly different treatment: short fiction, poems, drama, and primary source material such as letters, interviews, and diaries.
- *Multipublisher packages* (e.g., ebrary, netLibrary) are typically large, cover far-ranging subject matter, and may be static or dynamic. The primary challenge of handling these packages is that they are very large, and global changes can strain system capabilities.

Provider-Neutral Records: Benefits and Challenges

In August 2009, the PCC Provider-Neutral E-Monograph Record Task Group issued its cataloging guidelines for e-monographs.[17] Like the aggregator-neutral policy adopted

for electronic serial records in 2003, the PCC e-monograph record policy adopts the model of a single master record encompassing all equivalent manifestations of an e-monograph title rather than separate records for each provider's version.

The provider-neutral approach has two significant benefits. In a shared cataloging environment, like the WorldCat database, the provider-neutral approach halts the proliferation of incrementally different records for the same content. The extent of this problem is best illustrated with an example. According to the SerialsSolutions knowledgebase, Richard L. Shell and Ernest L. Hall's *Handbook of Industrial Automation* (Marcel Dekker, 2000) is available online from five different providers and is a component of more than a dozen packages. A search for this title in WorldCat yields twelve records for online manifestations, mostly duplicate records for the same two versions, one from ebrary and another from ENGnetBASE, both of which are part of UHL's e-book collection. Each provider has exposed slightly different bibliographic metadata, but the *Handbook* is the basis of all of them. In UHL's experience with aggregator-neutral serial records, fewer and more consistent e-resource records in the shared database have made finding and identifying appropriate records much easier for the cataloger. Effort once spent sifting through numerous similar records for the best match or inputting new records that closely replicate existing ones can be devoted instead to enriching the master record with subject headings, contents, and authority work. The new policy also does away with the distinction between reproduction and born-digital monographs and provides clear instructions for the use of fields that were previously applied inconsistently, such as 534 (Original version), 773 (Host item entry), and 776 (Other format).

Under the new guidelines, dates

006			m d
007			c ǂb r ǂd c ǂe n ǂg --- ǂh a ǂi n ǂj c ǂk a ǂl u
010			00031586
040			MND ǂc MND
020			0824703731 (alk. paper)
020			9780824703738 (alk. paper)
050	0	0	T59.5 ǂb .H28 2000
082	0	0	670.42/7 ǂ2 21
090			ǂb
049			TXHU
245	0	0	Handbook of industrial automation ǂh [electronic resource] / ǂc edited by Richard L. Shell, Ernest L. Hall.
260			New York : ǂb Marcel Dekker, ǂc 2000.
300			xi, 887 p. : ǂb ill. ; ǂc 29 cm.
504			Includes bibliographical references and index.
505	0		pt. 1. Mathematics and numerical analysis -- pt. 2. Measurements and computer control -- pt. 3. Automatic control -- pt. 4. Modeling and operations research -- pt. 5. Sensor systems -- pt. 6. Manufacturing -- pt. 7. Material handling and storage -- pt. 8. Safety, risk assessment, and standards -- pt. 9. Ergonomics -- pt. 10. Economic analysis.
533			Electronic reproduction. ǂb [Boca Raton] : ǂc CRC Press ǂd [2004?] ǂn Mode of access: World Wide Web.
650		0	Automation ǂv Handbooks, manuals, etc.
650		0	Process control ǂv Handbooks, manuals, etc.
700	1		Shell, Richard L., ǂd 1934-
700	1		Hall, Ernest L.
710	2		CRC Press.
730	0		ENGnetBASE.
856	4	0	ǂu http://www.engnetbase.com/ejournals/books/book_km.asp?id=3765

Figure 1. Reproduction E-Book Record

006			m d
007			c ǂb r ǂd c ǂe n ǂg --- ǂh a ǂi n ǂj c ǂk a ǂl u
010			00031586
040			MND ǂc MND
020			0824703731 (alk. paper)
020			9780824703738 (alk. paper)
050	0	0	T59.5 ǂb .H28 2006
082	0	0	670.42/7 ǂ2 21
090			ǂb
049			TXHU
245	0	0	Handbook of industrial automation ǂh [electronic resource] / ǂc edited by Richard L. Shell, Ernest L. Hall.
260			Boca Raton, Fla. : ǂb CRC Press, ǂc 2006.
505	0		pt. 1. Mathematics and numerical analysis -- pt. 2. Measurements and computer control -- pt. 3. Automatic control -- pt. 4. Modeling and operations research -- pt. 5. Sensor systems -- pt. 6. Manufacturing -- pt. 7. Material handling and storage -- pt. 8. Safety, risk assessment, and standards -- pt. 9. Ergonomics -- pt. 10. Economic analysis.
506			Access limited to subscribers.
538			Mode of access: World Wide Web.
650		0	Automation ǂv Handbooks, manuals, etc.
650		0	Process control ǂv Handbooks, manuals, etc.
700	1		Shell, Richard L., ǂd 1934-
700	1		Hall, Ernest L.
710	2		CRC Press.
730	0		ENGnetBASE.
856	4	0	ǂu http://www.engnetbase.com/ejournals/books/book_km.asp?id=3765

Figure 2. Born-Digital E-Book Record

006			m d
007			c ǂb r ǂd c ǂe n ǂg --- ǂh a ǂi n ǂj c ǂk a ǂl u
040			MND ǂc MND
020			ǂz 0824703731 (alk. paper)
020			ǂz 9780824703738 (alk. paper)
050	0	0	T59.5 ǂb .H28 2000
082	0	0	670.42/7 ǂ2 21
090			ǂb
049			TXHU
245	0	0	Handbook of industrial automation ǂh [electronic resource] / ǂc edited by Richard L. Shell, Ernest L. Hall.
260			New York : ǂb Marcel Dekker, ǂc 2000.
300			1 online resource (xi, 887 p.) : ǂb ill.
500			Description based on printversion record.
504			Includes bibliographical references and index.
505	0		pt. 1. Mathematics and numerical analysis -- pt. 2. Measurements and computer control -- pt. 3. Automatic control -- pt. 4. Modeling and operations research -- pt. 5. Sensor systems -- pt. 6. Manufacturing -- pt. 7. Material handling and storage -- pt. 8. Safety, risk assessment, and standards -- pt. 9. Ergonomics -- pt. 10. Economic analysis.
650		0	Automation ǂv Handbooks, manuals, etc.
650		0	Process control ǂv Handbooks, manuals, etc.
700	1		Shell, Richard L., ǂd 1934–
700	1		Hall, Ernest L.
776	0	8	ǂi Print version: ǂt Handbook of industrial automation. ǂd New York : Marcel Dekker, c2000 ǂw (DLC) 00031586 ǂw (OCoLC) 44046711
856	4	0	ǂu http://www.engnetbase.com/ejournals/books/book_km.asp?id=3765
856	4	0	ǂu http://site.ebrary.com/lib/nnnnnnn/docDetail.action?docID=10051256

Figure 3. Provider-Neutral E-Book Record

and publisher information are based on the original monograph, whether print or electronic. This change harmonizes cataloging practice with what UHL has discovered to be a user preference for seeing the original publisher and date information in the publication area. Most note fields have been eliminated, with the exception of a suite of notes that pertain to electronic manifestations emanating from the Digital Library Federation Registry of Digital Masters and other digital preservation projects. Archival digital masters are the only allowable use of the 506 (Restrictions on access), 533 (Electronic reproduction), 538 (System requirements), and 583 (Action) fields in master records. Figures 1–3 illustrate the difference between previous cataloging practice and the provider-neutral approach, again using the *Handbook of Industrial Automation* example. Figure 1 is for a version cataloged as a reproduction and figure 2 is for a hypothetical version cataloged as a born-digital manifestation. Figure 3 shows the same title cataloged according to the new provider-neutral guidelines. The major areas of difference include the following fields: 020 (ISBN), 260 (Publication, distribution, etc.), 300 (Physical description), 533 (Electronic reproduction), 710 and 730 (Added entry), 776 (Other format), and 856 (Electronic location and access). The basic description in figure 3 applies to all known online manifestations. Version-specific notes and access points, such as system requirements, reproduction information, provider and package name, and URL notes pertaining to library-specific access that appear in figures 1 and 2, are now considered local data and are not to be used in the provider-neutral master record. The record in figure 3 could replace all twelve records for electronic manifestations of this title that currently exist in WorldCat. The *Provider-Neutral E-Monograph MARC Record Guide* provides detailed coverage of the new encoding rules.[18]

While the provider-neutral e-monograph policy will bring greater structure and coherence to e-book cataloging, challenges remain for local batch record management. Few vendors have converted their existing records to a provider-neutral state. Hundreds of thousands of vendor records continue to be issued with reproduction notes and package and provider names, or are cataloged incorrectly as born-digital editions. Local implementation of the provider-neutral guidelines is not required even for PCC member libraries, so individual libraries must decide whether to convert existing records to the new standard now, wait for their data providers to make the change, or ignore the changes altogether. UHL is pursuing a gradual implementation that will bring provider-neutral records into the catalog at the time of their regularly scheduled updates rather than altering records already in the local catalog. UHL intends to proceed with this change irrespective of whether it is implemented in the cataloging copy provided by vendors, making the necessary updates through batch processes just as it has done in the past to clean up reproduction and born-digital records prior to load.

A more significant obstacle to full adoption of the provider-neutral standard at the local level is the lack of a reliable identifier to collocate equivalent manifestations on an automated basis. Two records for the same title from two different providers might share almost no metadata in common. Titles, edition statements, author entries, and ISBNs may vary in form and completeness. The ISBN comes closest to providing a standard identifier for electronic manifestations, but the ISBNs that appear in e-book records are too various to serve as an effective match point. UHL catalogers have seen nearly every possible type

of ISBN attached to vendor-supplied e-book records: print, electronic, ten-digit, thirteen-digit, volume, and set. Data providers do not always include ISBNs, and many e-monographs have no ISBN assigned. The provider-neutral cataloging guidelines are predicated on a human cataloger comparing one digital file with another, or a digital file with cataloger-produced metadata, and not yet clear is how libraries that draw e-book records from many disparate sources can efficiently identify and merge duplicates.

Cataloging standards differ greatly between providers. Some e-content providers offer MARC delivery as an integral component of their online products and adhere closely to cataloging standards. Others are persuaded to offer MARC records only after ongoing negotiations with their library customers, providing skeletal records with no enhancements. Still others provide unusual enhancements that improve the richness and utility of the available metadata but are limited to a very small number of records. For example, one of UHL's engineering e-book providers issues MARC records containing author, title, and subject access points at the chapter level. A provider of economics e-texts has made available records with minimal descriptive information and no name authority control, but rich abstracts and highly specific subject headings from a specialized thesaurus. As the provider-neutral model takes hold, catalogers must consider how to ensure that these rich access points are not lost when duplicates are merged in the local catalog. UHL can set load table parameters in UHL's local catalog to preserve the contents of certain fields or groups of fields when a record is overlaid. UHL has used this approach in the past to protect critical metadata, but it requires access to and knowledge of integrated library system records load tables, expertise that is not universal in the library community.

The variation between content providers in the handling of multivolume sets is also a potential obstacle to provider neutrality. One provider might link to an entire multivolume set through a single URL and issue a single MARC record for that title. Another might link to each volume separately but bring all volumes together on a single title-level record. Still another might provide a separate record for each individual volume. Such disparate practices complicate the task of merging records, particularly if resources are identified by a volume title rather than the set title. UHL is presently content to let these different approaches coexist in its local catalog, but the question remains whether such records can or should be merged in the future. The optimal user experience for finding and obtaining access to multivolume sets is an area ripe for further study.

The current PCC guidelines encourage the use of classification numbers for e-monographs. UHL has always classified its electronic resources (e-resources) when cataloging individual titles, but classification numbers are not ubiquitous in vendor-supplied records. UHL retains any Library of Congress–type classification numbers that are part of the record set but neither verifies the correctness of existing classification numbers nor adds them to records that lack classification. When classification does exist, any existing shelflist number is removed from $b and replaced with "ebook." The classification numbers are indexed in the local catalog and appear in the call number browse search, but they are not visible in the public record display because e-book records do not have attached item-level records (the means by which a call number displays to users in UHL's catalog). Because e-book classification numbers are searchable but not publicly viewable, they serve primarily as a collection management tool rather than an access point.

E-Book Cataloging at UHL

UHL provides access to more than sixty e-book collections totaling nearly 400,000 titles and representing every type of e-monograph content mentioned above. Rarely does UHL catalog an e-book individually, but e-book management is nonetheless a resource-intensive process requiring strategy, compromise, and detailed documentation. Catalogers evaluate each package to determine the cataloging approach that will bring usable bibliographic data into the library catalog as quickly as possible with minimal cost for initial access and low overhead for ongoing maintenance.

Individual Records

UHL catalogers handle e-books on a title-by-title basis only in limited circumstances. E-books cataloged in this manner generally meet one or more of the following criteria: They are of high value to UHL's collection, making visibility in WorldCat a priority; they are available permanently through a one-time purchase; records are not provided by the vendor or are of questionable quality; or the item is a stand-alone title, as is often the case with open access titles. Title-by-title cataloging of e-books has diminished in recent years as an increasing number of academic e-book providers have begun to offer MARC record services to their customers.

In the online environment, the distinctions between finite and continuing resources start to blur. Some titles that are finite monographs in print form behave like integrating resources in electronic form. These resources, usually reference works such as encyclopedias, have the look and feel of websites rather than books. While the textual content of the electronic version may be identical to that of its print counterpart at inception, the two versions diverge over time in appearance, functionality, and content.

UHL diverts continuously updating titles out of the e-book cataloging workflow and enters them instead into the local online-database list. This is a limited practice applied only for the small number of reference titles that explicitly declare themselves to be continuously updating, but the existence of such resources serves as an important reminder that the first cataloging question to ask about an e-book is whether it really *is* a book.

Batch Records

E-book collections at UHL underwent dramatic growth a decade ago with the purchase of several large netLibrary collections offered by regional consortia. Fortunately the purchase included bibliographic records for all titles in these collections because UHL staffing levels made individual cataloging impossible. The batch load approach proved to be ideally suited for large aggregated collections, particularly for subscription-based products that add and drop titles regularly, because catalogers did not have to determine which specific titles were added or dropped. The current record set simply could be loaded at regular intervals, overlaying the previous set. The limitations of vendor-supplied records, chiefly irregular cataloging and a lack of integration with the rest of the collection, were far outweighed by the benefits of timely availability and ease of updates. As a result, batch record loading was quickly established as the preferred process for providing access to e-books through the catalog.

Approximately 10 percent of the e-monograph records in UHL's local catalog are not for books, but for literary works such as poems and short stories, reports and other short-form monographic works, and primary source materials such as letters and interviews. While content of this nature is not typically published on a stand-alone basis in print form, UHL has been bringing bibliographic records for these short-format works into its catalog for many years. In recognition of the fact that many literature and primary source titles are not books, the term "e-text" is used in the link text (e.g., "Connect to this e-text") to signal to users that the content is not a traditional book even though the records look similar. Catalogers do not attempt to isolate individual records for use with this term; they apply it uniformly across any collection described by the vendor as being composed wholly or chiefly of literary, primary source, or other nonbook content. A unique format also could be applied to such resources in the local catalog. UHL has not yet pursued this direction because of concerns that subdividing e-resources into too many different categories would complicate retrieval. The advent of discovery tools with exposed facets may reverse this thinking, as users can now readily see available formats for their search results, determine how many results are associated with each, and switch their choice easily.

Batch Editing E-Book Records

Prior to August 2009, reproduction status was a defining bibliographic characteristic of an e-book and had a significant impact on how the description was arranged. Following Library of Congress Rule Interpretations 1.11A, a reproduction e-book was treated as a secondary manifestation of a nonelectronic original.[19] The publication information and physical description referred to the original, and a 533 (Electronic reproduction) field described the reproduction. An e-book did not have to be a facsimile reproduction to be cataloged in this manner, only an imitation close enough to serve as a substitute for the original.[20] A born-digital e-book was treated as a unique manifestation. The publication information referred to the electronic version, and many such records contained no physical description. Born-digital cataloging treatment did not necessarily imply that the text was original to the digital format, only that the appearance and functionality of the digital version were sufficiently different from the original to constitute a separate manifestation.[21] The provider-neutral guidelines largely do away with this distinction. The cataloger still may create separate records in the case of "substantial differences" in the content or subject of online versions, but the guidelines appear to define equivalent manifestations broadly and discourage the creation of separate records.[22]

The new PCC guidelines no longer require segregating born-digital and reproduction records for separate editing, nor do they require carefully standardizing reproduction notes and access points for packages and providers. Instead, records for reproductions, electronic manifestations issued simultaneously with print, and born-digital content must be reviewed to ensure that obsolete fields are not present. UHL has identified certain providers that catalog simultaneous electronic versions as born-digital editions with publication data pertaining to the original appearing variously in fields 500 (General note) and 534 (Original version note). Catalogers will need to move these data into field 260 (Publication, distribution, etc.) to comply with the provider-neutral standard. Catalogers also should examine and edit appropriately the record sets for packages containing literary and primary source works to ensure that the relationship to larger source works is correctly represented in the 534 field, if the metadata are available. Vendor-supplied records will continue to require editing to insert standardized link text in field 856 (Electronic location and access) subfield $3, the URL prefix for UHL's proxy server in field 856 subfield $u (Uniform resource identifier), and a series of coded fields that populate local fixed fields upon import. The records also include a 910

(User-option data) field with a record set name for administrative purposes. A package may comprise several separate record sets. For example, UHL purchased its netLibrary collection in eight separate parts from two different consortia. The ability to isolate and make changes to one of these parts without affecting the others proved useful when the record set for one part needed to be removed and reloaded. UHL recommends keeping sample records or a checklist of fields that should be present or absent as well as providing constant data for fields that require uniform encoding to reduce the incidence of data entry errors.

Vendor-supplied records are edited in batch mode using MarcEdit.[23] Thousands of MARC records can be edited at once using MarcEdit's powerful field transformation functions. Records are edited in human-readable text mode. When editing is complete, the files can be converted from text to MARC and merged or split into files of the desired size.

In the batch editing process, the record file or files are retrieved from the provider's site. In some cases MARC records can be reached through a provider's public interface, but more often a login is required. The URL from which the records for each package are available and any login information needed to download the records are stored in UHL's ERM system, to which the catalogers have access. The MarcEdit "MarcBreaker" function converts the raw MARC file (.mrc) to human-readable text (.mrk), where it can be manipulated with a variety of field-, subfield-, and indicator-level editing functions. Once the catalogers edit a file to local specifications, they compile it back into MARC format and save it to a local directory. The MARC file is then loaded into UHL's local Millennium catalog using a designated load table for batch records.

MARC field 001 (Control number) is a unique identifier field and the overlay point for records coming into UHL's local system. Vendor-supplied e-book records typically, but not always, provide an identifier in the 001 field. Sometimes the identifier that appears in this field is not unique; often this is the case when the record set contains separate records for multivolume titles and the identifier on each record is the same title-level identifier. When this is the case, these records will overlay each other when the set is loaded. To ensure that every record in an e-book record set has a unique ID in the local catalog, catalogers first use the MarcEdit "Field Count" function to verify that every record in the set contains only one identifier in field 001. If the occurrence of field 001 does not equal the number of records in the file, a new identifier must be created. If all records contain field 001, catalogers use the "Record Deduplication" function to be certain that no duplicate identifiers exist. Any discrepancy in the number of records before and after the "deduplication" process means the source file contains duplicate identifiers, and a new identifier must be created. UHL uses the URL as the basis for creating a unique identifier. The MarcEdit "Swap Fields" function is used to copy field 856 (Electronic location and access) $u (URL) into the 001 field and remove the portion of the URL that is constant, leaving a record-specific ID.

UHL has the added challenge of sharing its catalog with several other campuses, each of which administers its e-resources independently and catalogs them separately. To prevent unwanted overlays of other libraries' materials, a defined prefix is used in the 001 field to distinguish records by campus. For example, "uheenaS00011158" in field 001 denotes a University of Houston main campus record (uh) from the Early Encounters in North America database (eena), with a unique record number (S00011158). While unlikely, though not impossible, different record providers might use the same numbering scheme for completely different resources, particularly if the identifier is a simple numeric string. The campus and collection prefix approach has the added benefit of ensuring that record IDs will be unique across the entire catalog, regardless of origin.

Batch processing and loading are highly syntax-dependent, and one invalid character can prevent the MARC file from compiling or cause the load to fail upon import into the local catalog. Incorrect indicators and typographical errors can result in data indexing improperly or yielding poor search results. Not surprisingly, given the volume of records being exchanged, syntax and content errors occasionally appear in vendor-supplied record sets. Below are examples of errors UHL has found:

```
650 \\ instead of 650 \0
700 1/ instead of 700 1\
|b instead of $b
650 \0$aEffective teaching-
  New Zealand.
```

UHL uses the MarcEdit "Validate" function to identify syntax errors prior to compiling the MARC file. Content errors that catalogers do not discover upon initial review of the files are corrected by database maintenance staff as they are found.

Documenting Batch Processes

Postcataloging maintenance and updates are an important part of e-book management. Each package has its own update schedule based on the nature of the package. Most of UHL's large literary and primary source collections are growing slowly, and the providers periodically contribute new MARC records to the available record sets. UHL has found that, because of the sporadic and infrequent nature of changes, a yearly update is sufficient to

keep these sets up to date. A full new record set is loaded once a year to overlay existing records and insert any new records that have been added to the set in the intervening year. Reference and academic e-book packages are more demanding because many of these sets have monthly additions and deletions. A monthly update is not itself particularly onerous, but juggling such updates for several providers and packages quickly adds up to a significant amount of record handling. For some reference and academic e-book collections, monthly record sets of additions and deletions are provided, but not for all. If the provider does not provide separate files for monthly additions and deletions, catalogers load an entire new set. Any existing record that is not overlaid during this process is presumed to have been dropped from the set and is deleted accordingly.

Vendor-supplied e-book records offer an efficient way of providing timely access to e-books, but good documentation is necessary to sustain the process. Most vendors do not provide express notification that new records are available, so the cataloger at UHL has the responsibility to seek out updates on a regular basis. Catalogers in libraries that subscribe to numerous e-book packages may find keeping current with the status and cataloging details difficult. These data could include unique ID prefixes, number of records in the last update, date of last update, update frequency, where to obtain records, and, if the records are behind an administrative login, how to gain access. The UHL cataloging department maintains a table in its departmental intranet space detailing the package name and provider, syntax for the unique identifier, date of last update, and review frequency. Although the records in the local catalog show the date of latest update, update schedules are tracked separately so that catalogers can see at a glance when to update any given collection.

Catalogers should have a way to identify, manipulate, and remove records in batch from a library system when maintenance is needed. Defining critical fields for record management (such as the 001 field, which groups records by provider and package, and the 910 field) to identify subsets within a larger group of records, has been crucial to achieving this exit strategy. When a change to an entire collection's records is needed, catalogers can easily and reliably retrieve the entire batch for editing, output, or removal.

The Future of E-book Cataloging at UHL

E-book record management has required UHL's catalogers to cultivate a new awareness of the resource supply chain. More so than in the past, cataloging workflow decisions are closely connected to the manner in which a resource was purchased; a one-time purchase might be handled quite differently than a subscription to an aggregator, and an open access title differently than a major reference work. Cataloging concerns now have an opportunity to shape the direction of e-book purchasing. Curriculum and research support remain the primary criteria driving the acquisition of materials—as they should—but the needs of technical services can sometimes influence how materials are acquired. An unsustainable process is not beneficial to users, and UHL has begun to consider the total cost of resource management and access provision more closely as a factor in purchasing decisions.

E-books have made UHL's cataloging managers more aware of organizational capacity. Batch record management requires a very different suite of skills from traditional cataloging. UHL has had to consider carefully how to acquire and allocate the specialized skills needed to perform this work, including load table management, large-scale data manipulation, independent problem-solving, and the rapid adoption of new tools and processes. UHL is still discovering how best to distribute this type of work to achieve the same systematic output and quality control that traditional cataloging processes now deliver. Cataloging managers at UHL consider the current processes too complicated and fragmented to be delegated with confidence. Finally, the move toward Web-scale services has forced UHL and other libraries to reconsider what has been sacrificed to take advantage of the economy and speed of vendor-provided e-book records. Tens of thousands of UHL's e-resources do not show holdings in WorldCat, and holdings reclamation (reconciling non-OCLC local records with the WorldCat database and updating institutional holdings accordingly) is a complex and expensive process.

With few exceptions, UHL has found the MARC records supplied by e-book providers to be satisfactory, but three factors are moving the library away from using these records: the number of separate collections to be managed, the advent of individually purchased e-books, and the desire for provider-neutral records in UHL's local catalog. While retrieving, editing, and loading record sets is straightforward, the sheer number of different providers and collections has made this process too cumbersome to continue in its present form. UHL cataloging managers are seeking a more streamlined process that can be delegated easily to staff. Individual e-book purchasing has raised the issue of how acquisitions personnel will communicate to cataloging personnel the availability of new e-books. Such communications can be easily lost or ignored, and scaling title-by-title notification up to large numbers of resources is difficult. Finally, provider neutrality has long been a goal for e-book records in the UHL catalog, a goal that cannot be achieved

in the present environment unless the cataloging department devotes considerable effort to reviewing and deduplicating incoming records.

In fall 2009, UHL activated e-books within its e-resource knowledgebase (SerialsSolutions KnowledgeWorks) and began receiving e-book records. This approach is far from perfect—some of the records are derived from metadata in the knowledgebase rather than from cataloger-created MARC, and deduplication within the knowledgebase is an ongoing effort—but it satisfies the need for streamlined batch processing, efficient individual title processing, and provider neutrality. The transition to a single record provider will greatly reduce the number and variety of record loads that must be performed by the cataloging department, and because customization is applied to all e-book records coming from the service, records can be made to comply with the provider-neutral content standard without any further local editing. Regular notification and consistent records set the stage for a process that can be readily managed by paraprofessionals. As individual e-books are acquired, titles can be activated for public use by acquisitions staff as part of the receiving process, and the URLs can be verified in the knowledgebase at that time. A MARC record follows no more than thirty days later with the next monthly update. This process obviates the need for any kind of title-by-title communication to travel between acquisitions and cataloging, and the slight delay in making the MARC record available is offset by the fact that titles are available immediately through the e-resource portal. Finally, this approach enables UHL to rely on its vendor to do the strenuous and ongoing work of reconciling titles across providers and collections, work that—with the benefit of the vendor's superior technology infrastructure and programmer support—can be accomplished much more readily by the vendor than by the library.

Conclusion

Over the last decade, batch loading vendor-supplied records has enabled UHL to provide access to e-books and other e-monographs efficiently and inexpensively without compromising other cataloging activities. As e-book collections have expanded and diversified, however, the profusion of platforms, service models, and metadata standards has strained UHL's support infrastructure. UHL now uses a third-party resource management (MARC) service to reconcile titles across packages and supply provider-neutral records for as many resources and collections as possible. This approach has already given the library a simpler, more streamlined process that can be readily documented and delegated to cataloging staff, but it has not solved the problems inherent in mass record management. Until all of UHL's e-book collections can be managed through a single service, catalogers must continue to download and manipulate records from multiple sources. Furthermore, relying on the services of a third party to improve local workflow and impose provider neutrality does not constitute a robust, lasting solution.

The Provider-Neutral E-Monograph Record Task Group was charged not only with developing a content standard for provider-neutral e-book records, but also with recommending "ways to promote the use of these records among . . . publishers/providers who create and issue cataloging copy for online monographic records" and "best practices for flexible use of these records."[24] At the time of this writing (January 2010), none of UHL's record providers had altered their records to adhere to the new guidelines. The provider-neutral record standard, if adopted widely, will lead to clearer and more consistent e-book records, so bringing data providers into compliance with the new guidelines will be an important first step toward improving access to e-books. However, in the absence of a robust identifier that could be used to match and merge e-book records from different sources, e-book records in the local catalog will continue to be provider-specific, even if each provider separately follows the provider-neutral content standard.

The authors are hopeful that the Task Group will continue to play a leadership role in pursuing dialogue with publishers and providers who issue cataloging copy. Promoting best practices for exposing titles, ISBNs, and other identifying information will help to better facilitate correct identification and duplicate detection for e-content, whether the work is done locally by a library or centrally by an e-content management vendor. In addition, it would be helpful for the Task Group to explore and document tools and best practices for batch processes, including efficient mechanisms for overlaying records, merging records, maintaining holdings for multiple providers, and automatically identifying records for which the last copy or version has been withdrawn. Mass management of bibliographic records is an activity that extends far beyond traditional cataloging into provider practices for exposing metadata, acquisition models, and the systems aspects of data management. Nonetheless, the effective provision and use of bibliographic records are essentially a cataloging problem. Moving beyond record creation standards to address best practices throughout the entire supply chain for e-book bibliographic data is the next crucial step that will enable libraries to provide clear, consistent, and timely access to e-books through their library catalogs.

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Book Reviews

Edward Swanson

Functional Requirements for Authority Data: A Conceptual Model. Ed. Glenn E. Patton, IFLA Working Group on Functional Requirements and Numbering of Authority Records (FRANAR). Munich: K.G. Saur, 2009. 101p. $93.00 (IFLA members $84.00) hard cover (ISBN 978-3-598-24282-3); $93.00 (institutions only) e-book (ISBN 978-3-598-44039-7). IFLA Series on Bibliographic Control, vol. 34.

When the IFLA Study Group on the Functional Requirements for Bibliographic Records (FRBR) published their final report in 1998, they identified "data normally recorded in authority records" as warranting further study.[1] Consequently, in April 1999 IFLA established a Working Group on Functional Requirements and Numbering of Authority Records (FRANAR). This group's work—like that of the FRBR study group—has informed the development of our new cataloging code, Resource Description and Access (RDA), and of the broader IFLA Cataloguing Principles (ICP).[2] It has now been published as *Functional Requirements for Authority Data* (FRAD).

The original charge of the FRANAR working group included the investigation of an international standard authority data number (ISADN), but the group determined early on that this was no longer worth pursuing.[3] Likewise, subject authority data—originally within the group's purview—was hived off to a separate working group in 2005.[4] Therefore FRAD restricts itself to modeling the data that has historically been recorded in name and title authority records, i.e., those that deal with what FRBR calls Group 1 and Group 2 entities (bibliographic resources and agents, respectively).

FRAD explicitly models data rather than records in recognition of the fact that authority and bibliographic records, while historically separate, are not necessarily so. For example, a catalog record for a work might conceivably include both work-specific authority data such as a heading and references, and work-level bibliographic data such as content summaries, subject descriptors, and classification.

Because FRAD was undertaken as an extension of FRBR, it uses the same entity-relationship model to analyze its subject matter—to identify entities (objects of interest), their attributes, and the relationships between them—and notes the user tasks (including the FRAD-specific *contextualize*) supported by each attribute and relationship. Like FRBR, which extracts from our descriptive cataloging tradition the four Group 1 entities of *work*, *expression*, *manifestation*, and *item*, FRAD introduces into its model a set of fundamental entities that are both familiar to us and slightly foreign, the latter primarily because we are accustomed to seeing them expressed in the two-dimensional context of a catalog card—whether physical or online—and its machine-readable carrier, the MARC record. Using these fundamental entities as guideposts, the structure of FRAD can be stated as follows: Each *bibliographic entity*—the Group 1, 2, and 3 entities inherited from the FRBR model—is known by one or more *names* and *identifiers* (the latter entity excluding—perhaps unnecessarily—record control numbers). These in turn serve as the basis for *controlled access points* (the headings and references of our authority records).

FRAD also includes two "back office" entities helpful in the interpretation of authority data—*rules* and *agency*—as well as the associated user task of *justify*. The *rules* entity in particular provides a context for interpreting the scope and values of other entities in the model. For example, under the 1949 ALA cataloging rules, a change in the name of a corporate body did not typically signal a new *corporate body* entity, while under later rules it did. Similarly, under the first edition of the Anglo-American Cataloguing Rules (AACR), a persona was not considered to be a *person* in its own right, while under the second edition of AACR it is. The *agency* entity, on the other hand, may be of more limited use in a world where data in authority records may be added or modified by a variety of interested agencies, and audit trails for such discrete actions are difficult to resurrect.

Most attributes are familiar, though some such as *gender*, *affiliation*, and *field of activity* are new, having been introduced from one or another of the sources from which FRAD drew its inspiration. As with FRBR, these sources are principally international specifications not widely used in the United States, such as *Guidelines for Authority Records and References* and *UNIMARC Authorities*.

Finally, FRAD, like FRBR, makes explicit the various types of relationships that often exist between entities. Many of these relationships are implicit in the data carried in MARC records but not in the associated content designation. While humans have little trouble teasing out such implicit relationships, machines are notoriously obtuse in this matter. FRAD's explicitness in this regard will greatly aid machines in their efforts, if only by leading to additions and changes to the MARC21 authority format.

As can be seen from this review, in many ways the FRBR and FRAD models have been extrapolated from Things As They Are, which in most cases is also Things As They Were—a cataloger of 1970 would be able operate quite comfortably within these models. But they also carry in their structure the seeds of Things As They May Become. This is because entity-relationship models are very much at home in the online world, and over the long term, bibliographic data in such a world will be less and less constrained by the card catalog and MARC. It will be interesting to see how future catalogs take advantage of these models and once again are perceived to be saving the time of the reader.—*Ed Jones, (ejones@nu.edu), National University, San Diego, California*

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