From Metadata Creation to Metadata Quality Control: A Survey of Continuing Education Needs Among Cataloging and Metadata Professionals

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This study aims to examine the current state and needs of continuing education among cataloging and metadata professionals regarding metadata creation and management. Using nationwide survey data, the study finds an active interest in pursuing training and education opportunities on a wide variety of metadata-related topics. The survey results indicate, however, that some professional education needs are not being met by the type of training the respondents have received. In particular, there is strong interest in receiving training in topics relating to planning and management for metadata application, such as metadata quality control mechanisms and documentation, as well as training materials providing hands-on, practical solutions and guidance in an implementation environment. The survey also indicates a strong interest in short courses, including online programs, that are affordable, flexible, and practical for professionals in the field.

Keywords: metadata, metadata quality control, catalogers, metadata professionals, continuing education, needs assessment

Introduction

The ever-growing universe of digital library projects demands a broad community of information professionals with the up-to-date knowledge, skills and competencies needed to address new challenges in metadata creation and management. The rapid growth of digital repositories has led to an acute awareness of metadata as the principal building block in facilitating effective resource description, access, and sharing. New metadata standards and digital library technologies are being developed at a rapid pace as diverse communities of practice seek new ways to organize massive quantities of digital resources. The pace of change in the metadata environment creates an increased demand for continuing education programs that are designed to allow cataloging and metadata professionals to stay up-to-date with current and emerging standards and technologies for describing networked and digital resources.

The need for ongoing professional education is made even stronger by the collaborative, decentralized nature of

bibliographic control in the twenty-first century. As evidenced in *On the record: Report of the Library of Congress Working Group on the Future of Bibliographic Control* (2008), the evolving digital information and technology environment will likely require more active collaboration of the library and information communities as data are increasingly mined and shared from multiple information providers for resource discovery and sharing. Such data sharing and access across ever-growing distributed digital repositories and collections are derived from the creation of interoperable metadata based on accurate, complete and consistent resource description. In turn, factors hindering shared notions of metadata quality are also in part derived from resource constraints related to staff expertise, educational tools, and opportunities among institutions and communities implementing metadata projects. Research on continuing education needs is therefore needed to build a network of competent information professionals with the requisite knowledge, skills, and competencies to create, manage, and exchange quality metadata in a digital environment.

This study aims to examine the prevailing perspectives and interests of cataloging and metadata professionals regarding continuing education in metadata creation and management. While traditional library cataloging remains the principal responsibility expected from cataloging professionals, emerging knowledge and skill sets are increasingly being integrated into the core technical aspects of cataloging (Park, Lu, & Marion, 2009). Therefore, it is essential for this study to evaluate the continuing education needs of cataloging professionals and metadata professionals inasmuch as they play a major role in metadata creation and digital library projects within their own institutions (Park and Lu, 2009). Using nationwide survey data drawn from this professional community, we will explore

the avenues, methods, and areas of continuing education desired by these practitioners in the field. Toward this end, the following research questions will be examined:

1. What is the current state of continuing education and professional development in the areas of metadata creation and management?
2. What areas are sought by cataloging and metadata professionals for continuing education for metadata creation and management?
3. What educational resources and training are desired by cataloging and metadata professionals to facilitate metadata creation and application of controlled/uncontrolled vocabularies?

In this article, we will first review studies on professional development in relation to metadata creation and management. Then, we will elaborate on the survey method employed to conduct this study, the general characteristics of survey participants, and the validity of the collected data. The following section will present the study results, reporting on the ways cataloging and metadata professionals have approached their continuing education needs and presenting an analysis of their needs for ongoing training on metadata-related topics. The final section will summarize the study and present some suggestions for future studies.

Literature Review

Despite the importance of metadata in bringing bibliographic control to a distributed, multi-lingual Web-based environment, there is a critical lack of comprehensive continuing education opportunities for cataloging and metadata professionals' consultation (*On the record,* 2008). There is also a lack of definitive research focused on the continuing education needs of cataloging and

metadata professionals vis-à-vis metadata creation and management. Such research is critically needed to provide an adequate evidence base to develop well-designed professional programs to meet the challenges of the rapidly growing, dynamic world of digital information.

Technical services librarians, educators, and employers have long shared interest in the education and recruitment of catalogers. Intner and Hill (1989) presented a collection of practitioners' perspectives regarding the educational preparation for a cataloging career. Hill (2002) edited an updated compilation of more recent perspectives and concerns about cataloging education. One of the latest perspectives about the current state of education and employment in cataloging is found in a series of pre-conference presentations during the 2007 American Library Association (ALA) Annual Conference, *What they don't teach in library school: Competencies, education, and employer expectations for a career in cataloging* (2007). Joudrey (2008) presented the latest snapshot of the current state of cataloging education and found that traditional cataloging courses were being eclipsed by information organization and metadata courses as a requirement in a substantial number of LIS programs.

Park et al. (2009) is one of the latest studies that assesses the current state of professional responsibilities and skill sets required of new hires in cataloging positions, with an aim to identify emerging roles and competencies vis-à-vis the established knowledge of traditional cataloging standards and practices. They conducted a content analysis of 349 cataloging job descriptions advertised in the *AutoCAT* listserv in 2005–2006 using multivariate techniques of cluster and multidimensional scaling analyses. The results show that technological advances increasingly demand knowledge and skills related to electronic resource management, metadata creation, and computer and web applications. Emerging knowledge and skill sets are increasingly being integrated into the core technical aspects of cataloging such as bibliographic and authority control and integrated library system management.

In a subsequent study, Park and Lu (2009) focused on metadata professionals in a comprehensive content analysis of 107 job descriptions posted on AutoCAT from January 2003 through December 2006. Results show that the principal responsibility expected of metadata professionals concerns metadata creation (73.8%). In addition, electronic resource management, awareness of trends, and digital library development constitute the core areas of professional competencies demanded in the metadata profession. Their findings also indicate that knowledge and skills centering on traditional cataloging and classification standards (60.7%) remain highly relevant in the digital environment and accordingly to metadata professionals.

As shown, the existing literature has focused for the most part on educational requirements in LIS programs, the changing base of professional knowledge and competencies expected for entry-level positions, and the education and training of new hires. These types of studies do not address the importance of continuing education for practitioners in the field as changing technology and emerging metadata standards keep adding required skills and responsibilities in managing the ever-increasing volume of digital resources.

One of the few systematic studies on the continuing education needs of cataloging and metadata professionals was conducted by the Association for Library Collections & Technical Services (ALCTS) Continuing Education Task Force. The study was conducted in 2003 in response to the Library of Congress Bicentennial Conference on Bibliographic

Control for the New Millennium (2000), which sought to develop an overall strategy to address the challenges of "an explosion in the quantity of digital resources that have become available on the World Wide Web." While preparing its proposal for future continuing education programs, the ALCTS Task Force also conducted a Web-based survey focusing on the continuing education needs of current professional catalogers (ALCTS Continuing Education Task Force, 2003a).

The survey—based on 187 online responses mostly from catalogers or cataloging managers—presented a snapshot of the perceived needs for continuing education among professional catalogers. It did not ask respondents directly about what continuing education activities they had undertaken or wanted to pursue in the future. Rather, the survey asked what types of technical and non-technical skills or knowledge would be necessary for catalogers to provide access to electronic or digital resources. On the technical side, as shown in Table 1, the survey participants overwhelmingly agreed on the importance of MARC standards (96.8%) and AACR2 (90.4%), followed by Dublin Core (78.65%), XML (73.3%), and HTML (65.2%). The importance of metadata standards such as EAD (39.6%) and MODS (16.6%) were ranked rather low by the respondents. Concerning the types of non-technical skills, qualities, or knowledge required for digital project implementation, the respondents highly rated "workflow analysis," "team-building," "project leadership," and "time management." In addition, the lack of sufficient time (75.4%), money (69%), and training opportunities in convenient locations (66.8%) were the top three answers to the question of the chief obstacles standing in the way of the acquisition of new skills (ALCTS Continuing Education Task Force, 2003a, 2003b).

A similar survey on continuing education activities and attitudes of profes-sional catalogers was conducted in 2004 by Hider (2006). Based on 213 online responses from catalogers and other metadata specialists, the survey indicated that reading the professional literature (93%) was the most popular method of professional development, followed by short programs (82.2%). On the other hand, only 6.1% have taken formal post-MLS courses for professional development. As shown in Table 1, basic areas of metadata format, descriptive standards, and subject standards ranked highest on the list of topics covered in continuing education activities. Of the top ten topics, only markup languages were clearly unrelated to traditional cataloging, while metadata formats in Hider's analysis might be related to both traditional cataloging and emerging non-MARC standards. The average amount of time spent on continuing education activities was 4 hours per month.

On the question of future continuing education activities, Hider's survey (2006) also found that short courses were the most popular choice among respondents (71.8%). As shown in Table 1, metadata formats (63.4%), authority control (52.1%), and markup languages (52.1%) were the top three topics in which respondents expressed interest in receiving further training. Analyzing other identified needs, Hider suggested that professional catalogers were interested in upgrading their skills and knowledge in both traditional and emerging areas. The survey results also showed that the respondents considered lack of time to be the biggest barrier to professional development (76.5%), followed by lack of worthwhile opportunities (40.4%), lack of employer support (32.4%), and lack of incentives (12.7%). Almost half of the respondents stated "moderately" —and about 30% thought "considerably"—regarding the extent to which educational activities would help to advance their careers. Furthermore,

Table 1: Summary of Past Surveys on Professional Catalogers' Continuing Education Needs/Topics: Top Ten Responses.

Rank	Perceived Needs (ALCTS, 2003b)	Past Continuing Education Topics (Hider, 2006)	Future Continuing Education Needs (Hider, 2006)
1	MARC	Metadata format (e.g., MARC, Dublin Core)	Metadata format (e.g., MARC, Dublin Core)
2	AACR2	Descriptive standards (e.g., AACR2)	Authority control
3	Dublin Core	Subject standards	Markup languages (e.g., XML)
4	XML	Authority control	Internet cataloging
5	HTML	Internet cataloging	Digital library development
6	Scanning/digitization tools	Audio-visual cataloging	Descriptive standards (e.g., AACR2)
7	Thesaurus design/principles	Serials cataloging	Subject standards
8	Web authoring/design software	Cataloging of other type items	Cataloging of other type items
9	EAD	Management and supervisory skills	Web authoring and design
10	PowerPoint	Markup languages (e.g., XML)	Thesaurus construction

the survey showed that most respondents had a positive interest in formal certification programs other than short courses (54% "maybe," 24% "definitely").

While the survey results above do shed light on the continuing education and training needs of professional catalogers, the focus on the cataloging profession itself seems to limit the findings. As shown in the overall low ratings in the ALCTS survey for non-MARC metadata (other than Dublin Core) or Hider's treatment of the MARC and non-MARC metadata formats together, they do not seem to capture fully the role and competencies required by metadata professionals in the evolving digital information and technology environment. There is also insufficient attention paid to types of continuing education methods preferred by these professionals, such as online programs that are becoming an increasingly preferable option for librarians to advance their education, as shown in the OCLC report on the training and continuing education needs of library workers (Wilkie & Strouse, 2003). The question of budget and other types of limitations also must

be addressed in considering the professional utilization of continuing education resources and opportunities (Miksa, 2008a, 2008b). A lack of studies focusing on metadata creation and management highlights the need for further research on the current state of, and future needs for, continuing training and education among cataloging and metadata professionals in dealing with an explosion of networked and digital resources.

Survey Method

The objective of the research reported on in this paper is to examine the current state of continuing education for cataloging and metadata professionals in terms of descriptive metadata creation and use of controlled and uncontrolled vocabularies for subject access. We conducted a web survey using websurveyor (http://www.vovici.com). The survey included multiple-choice and open-ended questions (see Appendix for an excerpt of the survey instrument). The survey was extensively reviewed by members of an advisory board (a group of three experts

in the field) and was pilot-tested prior to being officially launched. The survey included many multiple-response questions that asked respondents to check all answers that applied.

Participants were recruited through survey invitation messages and subsequent reminders to the electronic mailing lists of communities of metadata and cataloging professionals. Table 2 shows the 10 mailing lists employed for the study. The 10 mailing lists were selected based on their representative characteristics in the field. Individual invitations (approximately 600) were sent to the department heads in the cataloging and technical services in academic libraries. We also sent out individual invitations and distributed flyers to selected metadata/cataloguing sessions during the 2008 annual ALA midwinter conference held in Philadelphia.

During the 62-day period from August 6 through October 6, 2008, a total of 303 completed responses were received by the survey management system. The survey attracted a large number of initial participants ($n = 1371$). Among the participants who started the survey, a total of 303 (22.1%) completed it. We suspect that many participants started but failed to complete the survey as they decided that the survey subject matter was outside the scope of their regular job responsibilities. The length of the survey also may have been a factor in the number of incomplete responses (Schonlau, Fricker, & Elliott, 2002). The survey had a total of 49 questions, many of which consisted of several individual multiple-choice questions in a matrix format intended to capture the complexity of the current metadata environment.

The respondents' profiles regarding job titles (see Table 3) and job responsibilities (see Table 4) show that most of the individuals who completed the survey questionnaire engage professionally in activities directly relevant to the research objectives, such as descriptive and subject cataloging, metadata creation and management, authority control, non-print and special material cataloging, electronic resource/digital project management, and integrated library system management.

Although the largest proportion of participants (44.6%) chose the "Other" category on the question of job title (see Table 4), it is reasonable to assume that the vast majority can be categorized as cataloging and metadata professionals. When they were further asked to specify their professional positions, most job ti-

Table 2: Electronic Mailing Lists for the Survey.

1. AUTOCAT: AUTOCAT@LISTSERV.SYR.EDU
2. Dublin Core listserv: DC-LIBRARIES@JISCMAIL.AC.UK
3. Metadata librarians listserv: metadatalibrarians@lists.monarchos.com
4. Library and Information Technology Association listserv: lita-l@ala.org
5. OnLine Audiovisual Catalogers electronic discussion list: OLAC-LIST@LISTSERV.ACSU.BUFFALO.EDU
6. Subject Authority Cooperative Program listserv: SACOLIST@LISTSERV.LOC.GOV
7. SERIALST: SERIALST@LIST.UVM.EDU
8. Text Encoding Initiative listserv: TEI-L@LISTSERV.BROWN.EDU
9. Electronic Resources in Libraries listserv: ERIL-L@LISTSERV.BINGHAMTON.EDU
10. Encoded Archival Description listserv: EAD@LISTSERV.LOC.GOV

Table 3: Job Titles of Participants (Multiple Responses).

Job Titles	Count/Percentage
Other	135 (44.6%)
Cataloger/cataloging librarian/catalog librarian	99 (32.7%)
Metadata librarian	29 (9.6%)
Catalog & metadata librarian	26 (8.6%)
Head, cataloging	26 (8.6%)
Electronic resources cataloger	17 (5.6%)
Cataloging coordinator	15 (5.0%)
Head, cataloging & metadata services	15 (5.0%)

tles given in their responses are associated with one of the cataloging and metadata/digital library-related professional activities as listed in Table 5.

Concerning the institutional background of participants, of the entire sample of survey participants ($n = 303$), less than half (39.9%) provided institutional information. This is likely because the question was designed to be optional, following a suggestion from the Institutional Review Board at Drexel University. We analyzed the institutional background from 121 responses. The majority of participants (75.2%) are from academic libraries, followed by participants from public libraries (17.4%), and from other institutions (7.4%). Another part of the survey shed some light on the types of institutions that the respondents worked for and the population that those institutions served. Concerning the type of degrees granted by their institutions, nearly half the respondents (49.8%) re-

ported that their institutions were doctorate-granting universities. These responses suggested that the survey results tended to represent the experiences and perspectives of cataloging and metadata professionals in academic, particularly research, libraries.

The survey data indicated that many respondents started to engage in professional activities related to metadata creation and management at least some years subsequent to their formal LIS education. In terms of educational backgrounds, the vast majority of the respondents (93.6%) had obtained MLS or more advanced degrees. In terms of work experience (see Table 6), more than half of the respondents (57.4%) reported over 5 years of professional experience: 6 to 15 years (31.1%) and 16 years and more (26.4%). Approximately one-third of the respondents (34.5%) reported 1 to 5 years of experience, while the rest (8.1%) reported less than a year of profes-

Table 4: Participants' Job Responsibilities (Multiple Responses).

Job Responsibilities	Count/Percentage
General cataloging (e.g., descriptive and subject cataloging)	171 (56.4%)
Metadata creation and management	153 (50.5%)
Authority control	147 (48.5%)
Non-print cataloging (e.g., microform, music scores, photographs, video-recordings)	133 (43.9%)
Special material cataloging (e.g., rare books, foreign language materials, government documents)	126 (41.6%)
Digital project management	101 (33.3%)
Electronic resource management	62 (20.5%)
Integrated library system management	59 (19.5%)
Other	51 (16.8%)

Table 5: Professional Activities Specified in "Other" Category.

Professional Activities	Count/Percentage
Cataloging & metadata creation	31 (10.2%)
Digital projects management	23 (7.6%)
Technical services	17 (5.6%)
Archiving	16 (5.3%)
Electronic resources & serials management	6 (2.0%)
Library system Administration	6 (2.0%)
Other (e.g., LIS education)	

sional experience. However, when they were asked about the number of years creating metadata for digital library materials, only about a quarter of the respondents (26.0%) reported over 5 years of experience, 31.4% reported 3 to 5 years of experience, while 26.0% reported 1 to 3 years of metadata creation experience and 16.7% reported that they had started to create metadata only within the previous year.

The gap between the respondents' professional experience and metadata creation experience suggests that there are strong continuing education needs among practitioners in the field that will give them opportunities to update their knowledge and skill sets in the newer area of metadata creation and management.

Results

The findings of this study can be divided into the following three main areas: (1) current interest and motivation of cataloging and metadata professionals in pursuing continuing education for metadata creation and management; (2)

their past experience with continuing education in this area, including types of continuing education programs and topics covered; and (3) types of future continuing education opportunities and areas of interest in which they are interested in receiving future training.

Current Interest and Motivation of Cataloging and Metadata Professionals in Continuing Education

There is a strong, widespread interest among cataloging and metadata professionals in engaging in continuing education activities. This indicates the extent to which cataloging and metadata professionals are faced with the proliferation of emerging standards, tools, and technologies for organizing a massive amount of digital information. An overwhelming majority of the survey participants indicated at least some interest in pursuing professional development opportunities for metadata creation ("very interested" 65.5%, "somewhat interested" 28.9%). Only about 5% of the respondents expressed a lack of enthusiasm for continu-

Table 6: Years of Professional Experience vs. Metadata Creation Experience.

Year	Professional Experience	Metadata Creation Experience
> 1 year	8.1%	16.7%
1–5 years	34.5%	57.4%
1–2 years		26.0%
3–5 years		31.4%
5 years	57.4%	26.0%
6–15 years	31.1%	
15 years	26.4%	

Note: Percentages do not total 100% due to rounding.

Table 7: Participation in Continuing Education Activities for Metadata Creation.

Response	Count/Percentage
Within the last 12 months	139 (45.9%)
1–2 years ago	69 (22.8%)
3–5 years ago	31 (10.2%)
More than five years ago	18 (5.9%)
Not sure	20 (6.6%)

ing education ("somewhat uninterested" 4.2%, "very uninterested" 1.4%). The high level of interest in keeping their knowledge and skills up-to-date through continuing education is reflected in the fact that nearly 70% of the respondents have participated in professional development activities within the last two years (see Table 7). Nearly half the survey participants have taken advantage of training opportunities to enhance their knowledge and skills for metadata creation within the last 12 months.

As shown in Table 8, an important motivation of cataloging and metadata professionals in pursuing continuing education appears to be strongly related to their expectations about its positive effect on their career advancement. More than 80% of the respondents agree that knowledge and skills for metadata creation gained through continuing education are likely to improve their career prospects ("very likely" 36.3%, "somewhat likely" 47.9%)—a percentage that conforms with the finding of Hider's survey (2006). The OCLC study indicates that continuing education opportunities are considered to be indispensable for all practicing librarians who need to keep current with new information technolo-

Table 8: Perceptions of the Effects of Continuing Education on Career Advancement.

Response	Count/Percentage
Very Likely	103 (36.3%)
Somewhat likely	136 (47.9%)
Somewhat unlikely	31 (10.9%)
Very likely	14 (4.9%)

gies and emerging trends in their fields (Wilkie & Strouse, 2003). Likewise, the survey results here suggest that cataloging and metadata professionals sense that their continuing education will likely provide the training necessary to open new career opportunities or enhance their current positions by demonstrating their professional preparation for the ever-changing world of metadata.

Past Experience with Continuing Education for Metadata Creation and Management

Given the strong interest in continuing education as outlined above, what have been the actual experiences of cataloging and metadata professionals in continuing education? The most important question seems to be what topics have been covered in their continuing education. The survey results indicate a wide array of metadata-related topics that have been explored by the survey participants. As shown in Table 9, metadata standards (50.5%) and content standards (43.6%) are the highest ranking topics covered in their continuing education programs. This indicates that one of the major challenges facing cataloging and metadata professionals is how to keep up with the proliferation of metadata schemes and content standards in the current digital library settings. A related area in which about a quarter of the respondents (26.4%) have received training is markup languages (e.g., XML) which have been adopted to encode and process most metadata standards.

A second group of continuing educa-

Table 9: Metadata-Related Topics Covered in Continuing Education
(Multiple Responses).

Response	Count/Percentage
Metadata standards (e.g., Dublin Core, MODS)	153 (50.5%)
Content standards (e.g., AACR2, CCO)	132 (43.6%)
Subject/controlled vocabulary standards (e.g., LCSH, AAT)	99 (32.7%)
Mark-up language (e.g., XML)	80 (26.4%)
Authority control	79 (26.1%)
Planning digital library projects	68 (22.4%)
Designing metadata creation guidelines and documentation	64 (21.1%)
Electronic resource management	44 (14.5%)
Thesaurus/taxonomy construction	41 (13.5%)
Metadata quality control mechanism	34 (11.2%)
Other	36 (11.9%)

tion topics concerns the establishment and maintenance of controlled forms of headings. As shown in Table 9, nearly a third of the respondents (32.7%) have had continuing education in subject/controlled vocabulary standards, while 26.2% and 13.5% have received professional development in authority control and thesaurus/taxonomy construction, respectively. These responses suggest that despite the increasing popularity of keyword searching, the principles of vocabulary control are still considered to be an important mechanism for ensuring the consistent and reliable collocation of search results.

A third group of metadata-related topics covered in continuing education involves planning and management for metadata implementation. Hillmann and Westbrooks (2004) note, for example, that once metadata concepts and principles are understood, choosing the right options for metadata implementations then becomes an integral part of successful digital library projects. As shown in Table 9, about one-fifth of the respondents have had continuing education on "planning digital library projects" (22.4%), "designing metadata creation guidelines and documentation" (21.1%), and "electronic resource management" (14.5%). The survey results suggest that emphasis on project planning may be demanded to meet the more immediate needs of information pro-

fessionals involved in metadata projects. The survey also shows that only 11.2% of the respondents have received continuing education in "metadata quality control mechanisms," such as developing metadata creation guidelines and using metadata creation tools. This lower percentage is troubling because many studies have shown that metadata quality assurance supported by documented practices and guidelines for metadata implementation is a critical step toward increased interoperability in a networked metadata environment (see Park, 2009, for comprehensive reviews; Bruce & Hillmann, 2004, for metadata best practices).

Looking at the methods of continuing education indicates that two methods have been adopted most widely by the survey participants (see Table 10). Workshops (81.2%) and conferences (70.0%) have been the most frequently used channels for continuing education. On the other hand, less than 30% of the respondents (28.1%) have pursued more formal professional development opportunities via credit course work in a LIS program. These numbers conform with the findings of Hider's report (2006), and the OCLC survey (Wilkie & Strouse, 2003), which showed workshops (84%) and conferences (71%) among the most widely used training and education methods while only 33% reported using certificate or degree-granting programs. The

Table 10: Types of Previous Continuing Education Methods (Multiple Responses).

Response	Count/Percentage
Workshops	246 (81.2%)
Conferences	212 (70.0%)
Credit course work in a library and information science program	85 (28.1%)
Internship	29 (9.6%)
Other	34 (11.2%)

Table 11: Hours Spent on Professional Development in the Last 12 Months.

Response	Count/Percentage
10–30 hours	155 (54.2%)
31–60 hours	43 (15.0%)
61–120 hours	10 (3.5%)
More than 120 hours	12 (4.2%)

Note: The table does not include the respondents expressing a lack of interest in continuing education.

survey did not specifically ask participants whether they have used face-to-face or online/distance delivery mechanisms for continuing education. However, an examination of specific answers provided in the "Other" category shows that online delivery methods, as represented in such responses as "online courses," "online tutorials," "online workshops," and "online classes," have been used by many and thus supports the relatively high usage of Web-based learning (43%) as reported in the OCLC survey (Wilkie & Strouse, 2003).

The predominance of workshops and conferences as continuing education methods over formal credit courses offered in LIS programs also appears to be evidenced by the amount of time that the survey participants spent on professional development in the last 12 months. As shown in Table 11, more than half of the respondents (54.2%) spent no more than 10–30 hours learning and/or enhancing their knowledge and skills on metadata creation, while 15.0% spent 31–60 hours on their professional development within the previous year. Less than 8% devoted more than 61 hours in pursuing continuing education in their field ("61–120 hours" 3.5%, "more than 120 hours" 4.2%). While these numbers are a little lower than the average amount of time spent on training and education (40–48 hours per year) as reported in the OCLC report (Wilkie & Strouse, 2003) and Hider's survey

(2006), they may be rather comparable because those studies both include self-study as a method of continuing education. Our survey data suggest that the respondents prefer shorter types of continuing education methods, such as workshops and conferences. Also, the variety of online delivery methods mentioned specifically in the "Other" category about types of previous continuing education (see Table 10) indicates that the convenience and flexibility afforded by information technology are important considerations for many cataloging and metadata professionals who are interested in continuing education opportunities that fit their schedules and allow them to learn at their own pace in the settings and times of their choosing.

A high degree of convenience and flexibility in continuing education ranks as the most important concern among cataloging and metadata professionals, as indicated by the list of what the survey participants see as the main obstacle(s) to acquiring knowledge and skills for metadata creation and management. As shown in Table 12, nearly two-thirds of the respondents (65.0%) point to "lack of time" as their biggest hurdle to pursuing continuing education, while the "difficulty/inconvenience of traveling for face-to-face opportunities" is a main obstacle for nearly half (46.9%). These numbers largely correspond with the findings of the ALCTS survey (2003a, 2003b) and Hider's survey (2006). When "lack of online resources" (24.1%) is

Table 12: Main Obstacles to Continuing Education (Multiple Responses).

Response	Count/Percentage
Lack of time	197 (65.0%)
Lack of financial resource	158 (52.1%)
Difficulty/inconvenience of traveling for face-to-face training opportunities	142 (46.9%)
Lack of training/continuing professional development opportunities	97 (32.0%)
Lack of support from employer	74 (24.4%)
Lack of online resources	73 (24.1%)
Other	28 (9.2%)

added to the mix, the survey results seem to confirm that cataloging and metadata professionals are struggling to take time out for professional development activities. The traditional education delivery mechanism where they receive training in a face-to-face, physical setting is therefore often not the best option for information professionals. For the majority of survey participants, an important consideration is flexibility that allows them to study and continue their professional education whenever and wherever it is convenient.

The survey results show that cost is another significant constraint facing cataloging and metadata professionals in their continuing education. As shown in Table 12, slightly more than half the respondents (52.1%) identify "lack of financial resource" as a main obstacle, while nearly a quarter (24.4%) see "lack of support from employer" as a major problem hindering their efforts to acquire new knowledge and skills in the area of metadata. In such an environment, affordability would play an important role in affecting the willingness and ability of cataloging and metadata professionals to pursue continuing education by lowering the direct costs for them and reducing the financial obligations on their employers.

Cataloging and metadata professionals seem to find a mismatch between their professional needs and the content delivered in continuing education programs. As shown in Table 12, "lack of training/continuing professional development

opportunities" is regarded as a major problem by nearly a third of the respondents (32.0%). However, close examination of specific answers provided in the "Other" category suggests that the problem is not about a lack of education opportunities per se. For example, some respondents state that "there are many overview workshops, but few on specific schemas," while others criticize about a "lack of training at an appropriate level," noting that many courses are either offered at a basic, "very low level" or are "too technical." Still others agree that "more in depth training is needed" while adding that they are not given specific opportunities to apply and practice what they learn in real-world—preferably on-the-job—settings. One of the main challenges for metadata project planners is how to translate and use metadata knowledge and skills acquired in the context of real-life projects (Hillmann & Westbrooks, 2004). Our survey responses also suggest that one of the major challenges for continuing education instructors is to incorporate a hands-on, project-oriented instructional design so that participating professionals will have guidance and opportunities to practice and apply what they have learned in continuing education programs in the context of relevant project implementations.

Professional Interest in Future Continuing Education Programs

Finally, in what areas are cataloging and metadata professionals interested in

receiving future training? Table 13 ranks future continuing education topics according to the percentage of "very interested" responses. While the respondents show strong interest in a wide array of metadata-related topics for continuing education, one conclusion seen clearly in the survey responses is that metadata standards continue to attract strong professional interest. While this topic ranks highest on the list of topics covered in their past continuing education (see Table 9), it also ranks second highest as a future area in which they are interested in receiving training. That 40.3% of the survey participants are "very interested" indicates a great need for ongoing training in the area of metadata standards in light of the proliferation of emerging standards and the frequency of changes and revisions in the current digital library environment.

Aside from the continuing interest in metadata standards, the most striking survey result may be that the respondents sense a strong need for continuing education in topics involving the creation and implementation of *quality* metadata. The largest percentage of the respondents (43.6%) are "very interested" in learning more about "metadata quality control mechanism," while it ranks lowest (11.2%) on the list of topics covered in their previous continuing education programs (see Table 9). Combined with a fairly high level of interest in "designing metadata creation guidelines and documentation" (38.6% vs. 21.1% in Table 8) and "writing metadata requirements" (32.0%), the survey results suggest that the respondents identify a clear gap between the current state of continuing education and the core competencies required to plan and manage metadata

Table 13: Topics of Interest for Future Continuing Education (Multiple Responses).

Response	Very interested	Somewhat interested	Somewhat uninterested	Very uninterested
Metadata quality control mechanism	43.6%	30.4%	7.3%	3.6%
Metadata standards (e.g., Dublin Core, MODS)	40.3%	32.7%	7.9%	4.3%
Mark-up language (e.g., XML)	39.3%	26.4%	11.2%	5.9%
Designing metadata creation guidelines and documentation	38.6%	32.3%	7.6%	6.3%
Authority control	34.0%	32.3%	13.9%	4.6%
Non-print and special material cataloging	32.7%	27.7%	14.9%	7.3%
Writing metadata requirements (e.g., user needs, regulatory requirements)	32.0%	28.4%	12.9%	7.9%
Semantic Web technology (e.g., RDF, OWL)	30.4%	24.1%	15.2%	11.6%
Subject controlled vocabulary standards (e.g., LCSH, AAT)	29.0%	33.7%	16.5%	5.0%
Content standards (e.g., AACR2, CCO)	27.7%	31.4%	14.5%	6.3%
Abstract models (e.g., FRBR)	27.1%	32.0%	17.5%	6.6%
Thesaurus/taxonomy construction	26.4%	30.0%	15.5%	7.9%
Planning digital library projects	26.4%	30.4%	16.2%	8.3%
Folksonomies (a.k.a. social classification/tagging)	25.7%	29.7%	17.8%	7.9%
Management and supervisory skills	23.8%	25.4%	18.8%	12.2%
Electronic resource management	22.4%	29.7%	19.1%	9.6%
Web design	22.4%	27.1%	19.5%	10.9%
Communication skills	20.1%	23.8%	21.1%	13.9%

Note: The table does not include the count of the respondents.

Table 14: Interest in Future Continuing Education Methods (Multiple Responses).

Response	Count/Percentage
Workshops	251 (82.8%)
Online tutorials	210 (69.3%)
Conferences	196 (64.7%)
Certification program in a library and information science program	77 (25.4%)
Credit course work in a library and information science program	62 (20.5%)
Other	13 (4.3%)

implementations. There is a great need for increased training in metadata quality and documentation practices, involving such issues as project design, profiling, and quality assurance processes.

The respondents show strong interest in seeking continuing education opportunities to explore markup languages: 39.3% respond that they are "very interested" in receiving training in the area, while only about a quarter have had continuing education in this topic (see Table 9). Strong interest in studying markup languages such as XML may reflect the increasing use of XML in expressing and managing metadata. Nearly a third of the respondents (32.7%) also express a great need for future training in "non-print and special material cataloging"—resulting from the recognition of the importance of various non-textual materials in digital collections.

Strong interest in authority control (34%) seems to reflect the problems of ensuring quality metadata in the current digital library environment where metadata records are often created and contributed without attention to authority control, with resulting inconsistency in resource description, retrieval, and system display (Salo, 2009). The principles of vocabulary control are an important mechanism for the establishment and maintenance of the consistent and reliable collocation of search results. The topic continues to attract interest from cataloging and metadata professionals for their continuing education; nearly 30% of the respondents (29.0%) express a high degree of interest in subject controlled vocabulary standards and over a quarter of the participants (26.4%) in thesaurus/taxonomy construction. User-generated uncontrolled vocabularies such as folksonomies (a.k.a. social classification/tagging) also draw strong interest from cataloging and metadata professionals as a method for organizing digital information resources. A quarter of the respondents (25.7%) and nearly 30% of the respondents (29.7%) express strong and moderate interest respectively in this topic.

When the survey participants are asked about how they would like to learn and/or enhance knowledge and skills on metadata creation and management, their responses show that the preferred methods for future professional development are similar to what were used in their past continuing education, i.e., workshops (82.8%) and conferences (64.7%). As shown in Table 14, however, the major difference is that nearly 70% of the respondents (69.3%) select "online tutorials" as their preferred continuing education method. Confirming the finding of the OCLC report (Wilkie & Strouse, 2003), this result supports the earlier suggestion that a high degree of flexibility and convenience is among the most important factors for information professionals and that continuing education through online programs is often the best option that allows them to study independently at their own pace.

The survey indicates a relatively low degree of professional interest in pursuing formal continuing education through LIS programs on top of the MLIS degree.

As opposed to the high level of interest in short-term, non-credit workshops that might be offered through LIS programs or professional associations, only about a quarter of the survey participants (25.4%) would like to update their metadata knowledge and skills through a "certification program in a library and information science program." This result seems to contrast with the more positive attitudes among professional catalogers as reported in Hider's survey (2006), although the numbers become fairly comparable if the large number of "maybe" answers (54%) are excluded from his survey data. Only about one in five respondents show interest in "credit course work in a library and information science program" (20.5%). The low ratings for formal university-based continuing education programs may be explained by the possibility that cataloging and metadata professionals tend to shy away from regular course obligations over an extended period. The lack of interest in certification programs suggests that these professionals have only limited interest in gaining formal credentials beyond their MLIS degrees. In this context, it is a reasonable stance that most practicing professionals do not find additional certification an attractive option for furthering professional and career growth—particularly when there are more convenient and flexible alternatives for continuing education methods, such as workshops, online tutorials, short term online courses, and conferences.

Conclusion

The pressing need to organize an explosion of distributed digital information demands a broad community of competent professionals who are prepared to update their knowledge and skills regularly to meet new metadata challenges and opportunities in the twenty-first century. In this study we aimed to gain a broad understanding of the current state of, and future needs for, continuing education and training for metadata creation and management through an examination of nationwide survey responses drawn mostly from cataloging and metadata professionals. The survey responses indicate the active interest of cataloging and metadata professionals in pursuing continuing education on a wide variety of metadata-related topics. Most respondents seem to perceive that keeping knowledge and skills up-to-date is an important part of improving their career advancement prospects.

The results of the survey indicate, however, that some current professional education needs may not be met by the types of training the respondents have received. While their continuing education topics have tended to focus on descriptive metadata creation and controlled vocabularies for subject access, the respondents show a strong interest in receiving future training in topics relating to planning and management for metadata application, such as metadata quality control mechanism and documentation practices. The survey results indicate that the cataloging and metadata professionals identify a clear gap between the current state of continuing education and the core competencies required to plan and manage metadata implementations. This gap between current and future training topics provides direction for where continuing education providers need to focus their efforts in developing professional development programs. The survey also finds that the majority of respondents are interested in training materials providing hands-on, practical solutions and guidance for their digital library-related projects in an implementation environment.

The survey data help to identify how continuing education programs need be structured and implemented to meet the needs of cataloging and metadata professionals. Workshops, online tutorials and

programs, and conferences are rated as the respondents' predominant choices for future continuing education methods. The survey results indicate that under-spending on continuing education is a serious issue, as shown in such responses as "lack of financial resource" and "lack of support from employer." The combination of full-time obligations and limited training and education budgets is a critical factor in explaining the preference for online programs, which provide the benefits of continuing education in a flexible, convenient manner with a minimum of travel expense and time away. For LIS programs to play a major role as providers of continuing education in metadata topics, the survey results indicate that they need to promote the delivery of short-term online courses that meet the needs of cataloging and metadata professionals in terms of flexibility, convenience, affordability, and practical orientation.

The findings of this study are not without limitations. Many studies (Hill, 2002; Joudrey, 2008) have shown that the number of cataloging courses required at ALA-accredited LIS programs has been decreasing in recent years. While this study focuses on continuing education for cataloging and metadata professionals, it would be worthwhile for future studies to explore the correlation between formal LIS education and professional development activities in the area of metadata creation and management. In what ways do the types of cataloging and/or metadata courses completed in LIS programs affect the knowledge and skill sets of LIS graduates and, as a consequence, their choice or initiative to pursue continuing education as working professionals in the field?

Also, while the self-administered online survey allows us to ask complex questions and collect data from a fairly large sample at once, a major problem with such surveys is that they sometimes do not capture the full context of continuing education needs for metadata creation and management. For example, the survey results indicate that the respondents are interested in seeking short term-training programs at a location and time that are as convenient as possible to them. Web-based online education seems to partially fit this description because it allows them to study at their own pace anywhere they have Internet access. However, it is necessary to pay attention to the broader context of such responses because there might be other issues inherent in their environment, such as lack of time and financial resource. The critical question is how the respondents might answer differently if they were in an environment where they would not have to limit themselves by time and financial resources. What would happen, for example, if they could expect sufficient employer financial assistance and even release time for continuing education? In such an environment, would they still report that they would not be interested in longer continuing education programs and would instead prefer short term programs only? Or would they answer differently and seize opportunities to take longer, formal courses if given the chance?

The findings of this study should be further refined by incorporation of other research methods such as follow-up telephone surveys and face-to-face focus group interviews. Furthermore, it is important to address questions about viable business models for metadata-related continuing education and whether the current economics of continuing education programs fit for working professionals when lack of financial resource is indicated as a major factor affecting access to continuing education opportunities among practitioners. The inherent limitations of the study represent fruitful ground for further research on the continuing education needs of cataloging and metadata professionals in the evolving metadata environment.

Acknowledgments

Appendix—Survey Instrument Excerpt

34. How interested are you in continuing education for metadata creation?
    __ Very interested
    __ Somewhat interested
    __ Somewhat uninterested (skip to question #38)
    __ Very uninterested (skip to question #38)

35. Please specify the ways in which you have pursued continuing education for metadata creation. (please check all that apply)
    __ Internship
    __ Workshops
    __ Conferences
    __ Credit course work in a library and information science program
    __ Other (please specify)

36. How recently have you had continuing education for metadata creation?
    __ Within the last twelve months
    __ 1–2 years ago
    __ 3–5 years ago
    __ More than five years ago
    __ Not sure

37. Which of the following areas did this continuing education cover? (please check all that apply)
    __ Metadata standards (e.g., Dublin Core, MODS)
    __ Content standards (e.g., AACR2, CCO)
    __ Designing metadata creation guidelines and documentation
    __ Metadata quality control mechanism
    __ Subject/controlled vocabulary standards (e.g., LCSH, AAT)
    __ Electronic resource management
    __ Thesaurus/taxonomy construction
    __ Authority control
    __ Planning digital library projects
    __ Mark-up language (e.g., XML)
    __ Other (please specify)

38. In the last 12 months, how much time did you spend on professional development in the area of metadata creation and application of controlled vocabularies?
    __ None
    __ 10–30 hours
    __ 31–60 hours
    __ 61–120 hours
    __ More than 120 hours

39. How would you like to learn/enhance knowledge and skills on metadata creation? (please check all that apply)
    __ Credit course work in a library and information science program
    __ Certification program in a library and information science program
    __ Online tutorials
    __ Conferences
    __ Workshops
    __ Other (please specify)

40. In which of the following areas would you be interested in receiving training (VI–Very interested, SI–Somewhat interested, SU–Somewhat uninterested, VU–Very uninterested)?

    • Metadata standards (e.g.., Dublin Core, MODS)
      ___ VI ___ SI ___ SU ___ VU
    • Content standards (e.g., AACR2, CCO)
      ___ VI ___ SI ___ SU ___ VU
    • Designing metadata creation guidelines and documentation
      ___ VI ___ SI ___ SU ___ VU
    • Metadata quality control mechanism
      ___ VI ___ SI ___ SU ___ VU

- Writing metadata requirements (e.g., user needs, regulatory requirements)
  ___ VI ___ SI ___SU ___VU
- Subject controlled vocabulary standards (e.g., LCSH, AAT)
  ___ VI ___ SI ___SU ___VU
- Electronic resource management
  ___ VI ___ SI ___SU ___VU
- Abstract models (e.g., FRBR)
  ___ VI ___ SI ___SU ___VU
- Thesaurus/taxonomy construction
  ___ VI ___ SI ___SU ___VU
- Authority control
  ___ VI ___ SI ___SU ___VU
- Non-print and special material cataloging
  ___ VI ___ SI ___SU ___VU
- Planning digital library projects
  ___ VI ___ SI ___SU ___VU
- Mark-up language (e.g., XML)
  ___ VI ___ SI ___SU ___VU
- Web design
  ___ VI ___ SI ___SU ___VU
- Semantic Web technology (e.g., RDF, OWL)
  ___ VI ___ SI ___SU ___VU
- Folksonomies (a.k.a. social classification/tagging)
  ___ VI ___ SI ___SU ___VU
- Management and supervisory skills
  ___ VI ___ SI ___SU ___VU
- Communication skills
  ___ VI ___ SI ___SU ___VU

41. What are the main obstacle(s) for acquiring knowledge and skills for metadata creation and application of controlled vocabularies? (please check all that apply)
  __ Lack of support from employer
  __ Lack of time
  __ Lack of financial resource
  __ Difficulty/inconvenience of traveling for face-to-face training opportunities
  __ Lack of online resources
  __ Lack of training/continuing professional development opportunities
  __ Other (please specify)

42. How likely would knowledge and skills for metadata creation improve your career prospects?
  __ Very likely
  __ Somewhat likely
  __ Somewhat unlikely
  __ Very unlikely

43. How interested would you be in a formal certification program for metadata specialists?
  __ Very interested
  __ Somewhat interested
  __ Somewhat uninterested
  __ Very uninterested

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