

Competencies Needed for Librarianship in a Networked Society

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ABSTRACT: The “Networked Society” may be interpreted in many ways. The term “networked” is most simply defined as “connected together for communication or other information sharing.” (Readiness for a Networked World, A Guide for the Developing Countries). Networking is an important part of library education and research terminology, but more recently the concept of “digital libraries” has become the focus of networking and the networked society. By one count, the number of courses on the subject of digital libraries has more than doubled in the past four years (Liu, 2004). As the digital library community has evolved, the importance of the basic elements of librarianship is being recognized. (Allard, 2002) There are calls for the restructuring of library and information science education programs to support the need for digital librarians. Yet, it is recognized that we do not know much about what is required to produce professionals to work as digital librarians in a networked society (Spink and Cool, 1999). This paper examines the trends in library education and research on networking as reflected in curricular trends for digital librarianship. A detailed analysis of the special challenges of competencies for cataloging in a networked society is also undertaken, with a focus on the relationship of cataloging competencies to those competencies needed for digital librarianship in a networked society. The paper also discusses current research and educational programs relating to competencies and guidelines for digital librarianship in the networked society. The IFLA funded research on the need to develop specific educational guidelines for digital librarianship is also discussed.

Introduction

This paper will look at the competencies needed in a networked society by graduates of library and information studies programs from the perspective of competencies needed to work with digital content in what has generally been labeled "digital libraries." There is little consensus in the literature on what digital libraries are. The definitions range from “Digital libraries basically store materials in electronic format and manipulate large collections of those materials effectively.” (DLI UIUC Glossary, 1998) to “A digital library comprises digital collections, services and infrastructure to support lifelong learning, research, scholarly communication and preservation.” (“Digital library” Wikipedia, 2005).

Some definitions limit the content of digital libraries to traditional materials, such as the InterAcademy Council definition: “Digital libraries: collections of information – originally in the form of printed books, journals, and monographs; databases; photographs, motion pictures, and videos; sound recordings; and digital format – made accessible to everyone, everywhere in electronic format through organized sites on the World Wide Web.”

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(InterAcademy Council, 2004). Some use the terms “Virtual Library” or “Electronic Library” to refer to what others call a digital library. In order to discuss educating people to work with digital library collections, we must adopt a definition so course work and skill requirements can be identified.

A definition based on the Digital Libraries Federation working definition has been adopted by the authors of this paper. “Digital libraries are organizations that provide the resources, including the specialized staff, to select, structure, offer intellectual access to, interpret, distribute, preserve the integrity of, and ensure the persistence over time of collections of digital works so that they are readily and economically available for use by a defined community or set of communities.” (Waters, 1998). This definition seems to fit most of the functions carried out by libraries and is compatible with the tradition of education for library services found in most schools of library and information studies today. The major difference, of course, is the term “digital works” which takes the library beyond the traditional formats found in most libraries.

Perceptions of Digital Librarianship in literature

Saracevic and Dalbello wrote in 2001 that Library and Information Studies (LIS) education has not been a leader in the development of digital libraries, but as in so many other instances, a follower. They suggest that digital library research has been primarily done by computer scientists while the library and information studies community has focused on the applications and practice, not the research. They use the astronomical metaphor of the digital library research community and the digital library practice community being in the same planetary system, but one is on Mars and the other on Venus (Saracevic and Dalbello, 2001, p. 212). The suggestion that librarians are focusing on practical applications (the Venus connection) while computer scientists are doing most of the ground breaking research that supports the practical applications (the Mars connection) seems to be borne out by an informal review of those in libraries and those teaching and doing research in schools of library and information studies. If Mars is associated with the male gender and Venus with female, most LIS faculty doing digital library research seem to be male and most librarians are female. Whether this gender pattern holds true when specific responsibilities for digital librarianship are examined remains to be determined. But there is more to the Mars and Venus distinction, of course than just gender. There may be other aspects, such as service orientation and holistic, community orientation that also contributes to the divisions implied by this planetary metaphor.

Curricular Trends in Education for Digital Librarianship

It was the use of the digital computer to store information that gave rise to the term “digital library.” By the 1980s, computer science was taking the initiative in developing digital libraries. In the early 1990s there was a significant increase in funding for digital library projects and at that point libraries and library education became more involved. National funding sources had much to do with the focus on digital libraries in the U.S. and in the U.K. The first U.S. Federal Government funding began in 1994 with the federated Digital Library Initiative (DLI-1). Since 1994, additional funding has become available from numerous sources, including the National Science Foundation and the Institute for Museum and Library Services (Mischo, 2004). In the U.K, the “eLib” program was started in 1994 with funding for 70 digital library projects. Most of the eLib and U.S. Digital Libraries

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Initiative were focused on academic libraries and in the case of eLib, funds were allocated in smaller amounts to many library projects, while the U.S. Digital Library Initiative focused on a few large projects (Pinfield, 2004).

One of the first surveys of LIS course offerings on digital librarianship was conducted by Spink and Cool in 1998. They used two methods. They analyzed the websites of LIS schools to determine if courses were listed that dealt with digital libraries. They also put out a call on an LIS listserv on the web for people to respond as to whether they offered courses on digital libraries. Twenty institutions responded to the listserv that they had courses on digital libraries. Twelve of the respondents were from U.S. institutions, and of these, 10 were American Library Association (ALA) accredited programs. Of the eight from outside the U.S. one was from Europe (U.K.) and the rest were from areas outside Europe. The analysis of the websites confirmed the findings reported to the listserv. Most of the courses identified were technical in orientation and focused on construction of digital collections (Spink and Cool, 1999).

Saracevic and Dalbello did a second survey on education for digital librarianship in 2001 (Saracevic and Dalbello, 2001). They used similar methods to Spink and Cool, but found a significant increase in the number of digital library course offered at ALA accredited programs. Forty-seven (nearly 90%) of the ALA accredited programs in 2001 had courses that dealt with digital libraries, but only 15 of these were specifically dedicated to digital libraries. The other courses identified by Saracevic and Dalbello were courses that included digital libraries as a unit in the course, but were not exclusively digital library courses. Saracevic and Dalbello took their analysis further and looked at the course content of the 47 courses that concerned digital libraries. They identified the following elements as part of the course content.

- knowledge management
- standards
- document structure and electronic text
- preservation
- community building and social context

Yan Quan Liu did a third survey of courses for education of digital librarians in 2003. She also used the website analysis method and she examined library and information study programs around the world. She found 36 websites with digital library courses. This compares with 20 such websites found in 1999. Twenty of the 36 schools identified as having digital library courses were ALA accredited programs, twice the number found in the 1999 survey. The remainder of the programs were computer science or LIS programs in Europe, South America or Asia. Among those programs that were in LIS, the course content tended to be technical in programs outside North America, while in North America content focused more on organizing, preserving, managing and providing access to collections (Liu, 2003).

A review of the results of these three surveys of LIS education for digital libraries suggests that the three most common elements are Computer Science, Library and Information Studies, and Communication. While other elements can be identified, competencies

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relating to Computer Science and Library and Information Studies seem to be central to most of the course content.

Competencies needed for Digital Librarianship

Spink and Cool, in their 1999 article, proposed a model curriculum for digital librarianship. They developed their content as a blend of LIS and Computer Science curricula to achieve a general digital libraries program of study. The following are their broad curricular headings and the content that might be offered under each heading:

Theoretical and Historical Foundations

History of libraries; Human information behavior; Information retrieval theory; Development of digital collections and digital libraries

Technical Infrastructure of the Digital Library

Information retrieval engines; Database construction of digital libraries; Distributed collections; Multimedia formats and applications; Interoperability; Network technology; Web applications in digital library collections; Interface design; Communication protocols; Query languages

Knowledge Organization in Digital Libraries

Metadata; Indexing; Classification; Database integration; Document formats

Collection Development and Maintenance

Digital archives; Digital conversion technology; Digital preservation

Information Access and Utilization of Digital Libraries

Users and uses of digital libraries; Usability and evaluation research; Information behavior in digital libraries

Social, Economic and Policy Issues

Electronic publishing; Scholarly communication; Copyright issues and intellectual property rights in digital library collection; Costs of building digital library collections; Funding for digital environments

Professional Issues

Roles and responsibilities of the digital librarian; Management of digital libraries; Bibliographic instruction

The Critique of a Model Curriculum

In 2002, Coleman raised some questions about the model curriculum content proposed by Spink and Cool. The questions included the following:

- Would the recommended digital libraries curriculum increase Library and Information Studies (LIS) fragmentation?
- Would an approach that integrated Digital Librarianship (DL) into the standard LIS curriculum make a separate DL program unnecessary?

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- Would a separate program for DL merely split LIS graduates into traditional and Information Technology-intensive roles?
- Should Library and Information Studies or Computer Science faculty teach in the DL program?
- What is the appropriate level (UG, Graduate, Post Master's) to teach the DL program?
- What balance should there be between "Hands on" vs. Conceptual topics in DL programs? (Should emphasis be on tools and technologies or the environment and context?)

Analysis of Curricular Content of Specific Programs

Since the curricular content reflects the competencies library educators perceive as relevant to digital librarianship, as well as providing an opportunity to answer some of the questions raised by as well as providing an opportunity to answer some of the questions raised by Coleman above, this paper looks at the current state of education for digital librarianship in the U.S. by looking at four of the schools that have recently announced formal programs of study to educate students specifically in digital librarianship. These four schools are:

Indiana University - Master's Degree - DL Concentration

<http://lair.indiana.edu/research/dlib/>

Rutgers University - Master's Degree - Digital Libraries Concentration online

<http://www.scils.rutgers.edu/programs/lis/OnlineMLIS.jsp>

Syracuse University – Certificate of Advanced Study in Digital Libraries

<http://istweb.syr.edu/academics/graduate/mls/digitallibraries/index.asp>

University of Illinois - Certificate of Advanced Study (6th year CAS degree) - DL Concentration

http://www.lis.uiuc.edu/gslis/degrees/cas_dl.html

Note that two of the four programs are for the master's degree while the University of Illinois' program is for the 6th year (post master's degree) certificate of advanced study and the Syracuse University program appears to be a post-bachelor's non-degree certificate. Also note that the Rutgers program is offered exclusively online. The other programs may have online delivery components, but they are also offered as residential programs on campus. The details of the courses required and/or recommended for each of these programs may be found in Appendix 1 of this paper.

A review of these four programs of study suggests a variety of skills are seen as appropriate for librarians working with digital libraries. Most have both computer science and LIS course content, although some specify that the courses are to be taken from the Computer Science schools, not LIS. Of the two master's degree curricula, Rutgers seems to have the

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most traditional LIS content within their electives, with courses such as Cataloging and Classification and Management of Libraries and IT for Libraries listed among the electives and two required noncredit LIS “core” professionalization courses. Indiana University, however, also requires a basic “core” of professional courses be taken in addition to the more technical electives listed. In both cases, the master’s degree with a DL concentration is based on the foundation of library and information studies.

The CAS degrees, however, are not as clearly based on the LIS foundation and differ greatly from each other. The Syracuse University Degree is not a 6th year degree, requiring only a bachelor’s degree for admission. This CAS also indicates that “A library background is not a prerequisite for applying to this certificate program, although prior exposure to library work is desirable.” (Syracuse University, 2005).

The University of Illinois CAS is a 6th year degree beyond the master’s degree and requires a master’s degree in LIS or a closely related field. While “closely related field” is likely to be interpreted broadly to include computer science and other technical fields, the Illinois program does suggest a potentially closer tie to the LIS profession than the Syracuse University CAS.

How these courses of study finally work out will be something that time will determine. But clearly there is not a consensus on the skills required if the requirements for admission and graduation for the four programs being established in the U.S. are an indication.

Questions on the Future of Education for Digital Librarianship

As noted earlier in this paper, the research that has resulted in the technological applications that have made digital libraries possible has its origin in computer science and the technical side of information science. But the four prototype educational programs for digital librarians, as can be seen by the examples presented above, are based in schools of library and information studies. A review of the websites of highly ranked computer science programs did not identify any programs concentrating on training digital librarians. In 2003, Johns Hopkins University announced that it was establishing a concentration in digital libraries in a Master of Arts in Communication in Contemporary Society (Johns Hopkins University, 2003). By 2004 the degree in digital libraries had been abandoned and a Master’s Degree in Communication with a concentration in digital technology was substituted (Johns Hopkins University, [2004]). Johns Hopkins does not have and never has had a school of library and information studies. Is there a message in the decision by Johns Hopkins University to drop a concentration on Digital Libraries? At least this event should raise some questions for us, as librarians to consider.

One question might be whether educational programs with digital library concentrations are necessary? Could it be that the practice of digital librarianship has evolved beyond the need for specific programs in digital librarianship? If special concentrations in digital librarianship are not needed, what needs to be added or changed in our traditional education programs for librarianship to meet the skills required in digital librarianship?

Research in Progress on Education for Digital Librarianship

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There are three current research efforts relating to education for digital librarianship that have significant implications for determining the competencies needed for a networked society. The first is funded by a research grant from the Association for Library and Information Science Education (ALISE) and is being conducted by Youngok Choi and Edie Rasmussen. The title is: "Digital Librarians: Who Are They, What Skills Do They Need, and How Can They Be Educated?" The study proposes to analyze the knowledge, skills, and qualifications expected of digital librarians in academic libraries and to design educational programs to meet the needs of digital libraries and digital librarianship. In this research, data for roles, skills, and educational needs of digital librarians will be gathered from job announcements and by conducting a survey of digital librarians in the Association of Research Libraries (ARL) member libraries. The report on this research should be available early in 2006.

The second project is funded by the Institute of Museum and Library Services (IMLS) and is being conducted by LIS schools at Indiana University and the University of Illinois. This collaborative project between the two LIS schools proposes to develop or enhance curricula on digital librarianship and increase the number of students enrolled who can become digital librarians. The Indiana University and the University of Illinois digital library degree concentrations described earlier in this paper are funded in part by this grant. But just as important to the interests of this paper is the goal of the project to gather data on the skills and knowledge needed to work with digital library collections and to determine what librarians need to know about technology to work effectively with information technology (IT) professionals. The report on the findings of this project should be available early in 2007.

The third project is funded by IFLA and is one this author is involved in along with Niels Ole Pors from the Royal School of Library & Information Science in Copenhagen, Denmark. This study will examine the curricular trends for digital librarianship and is intended to provide the background for the updating of the IFLA Guidelines for Professional Library/Information Education Programs, last revised in 2000. The results of this project will be reported on 2006 at the IFLA World Library and Information Congress in Seoul, Korea and will be made available through other means.

Special Challenges of Competencies for Cataloging in a Networked Society

Another way to examine the extent to which library science students are prepared to work in networked library environments is by examining the curriculum of a more traditional course such as Cataloging. Cataloging is one aspect of librarianship that requires competencies similar to those necessary for work with digital library collections. The basic tenants of the cataloging field call for an understanding of technology and an appreciation for interoperability, exchange of information, and international standards, placing cataloging in the center of what students need to know in a networked society. Although syllabi for Cataloging courses vary by instructor, there is a consistency of subject matter required for certain competencies that are addressed in nearly every cataloging course. For these reasons, instruction in Cataloging courses can successfully meet several of the objectives set forth for networked society and could be considered as a way of complementing studies in digital librarianship.

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Due to the nature of the work, cataloging librarianship uses modern library technology. The cataloging surrogate is in an electronic format and is easily exchanged among library institutions. The descriptive cataloging that is part of the surrogate, including the order of the elements in the bibliographic record, the choice and form of access points, and the punctuation separating the elements of description are all based on established standards. The way that the bibliographic record is encoded using MARC tagging is another example of cataloging's use of technology. Indeed, libraries find it economically advantageous to participate in the exchange of standardized records -- "from each library according to its means, to each according to its needs" (Gorman, 2002, p.2). Although networked libraries may have different reasons for the electronic formats they use and the standards behind their operations, the skills required of the practitioner are comparable. For these reasons, competencies needed for professional cataloging can be adapted to serve in a networked library environment.

The four U.S. Digital Libraries programs discussed above in this paper could be considered as having courses representative of the Cataloging curriculum as it applies to a networked society. Cataloging courses may be called by different names that indicate how the topics covered are applicable to a variety of circumstances and not just to professional cataloging. At Indiana University students in the MLS are required to take one of two courses to learn to "Organize and Represent Information Resources." Neither course is called Cataloging, but the second focuses on bibliographic access and control as it pertains to monographs and is based on AACR2r (Indiana University, 2002). In an article from 1999, Spillane notes that the number of library science programs requiring coursework in Cataloging went down in the period from 1986-1998 (Spillane, 1999). The other three schools with Digital Libraries programs are among the library science programs that do not require Cataloging at the masters level. To earn an MLIS at Rutgers or an MSLIS at the University of Illinois or Syracuse University, it is not necessary to take Cataloging (Rutgers, 2005; University of Illinois, 2005; Syracuse, 2005).

Within the Cataloging course, there are certainly some common elements present. These elements are brought forth in popular cataloging textbooks such as Arlene Taylor's *Waynar's Introduction to Cataloging and Classification*, currently in its ninth edition revised (2004). Students of Cataloging learn about the internationalization of standards that allow for record sharing in the profession. They study the way that integrated library systems interpret and display the information present in the surrogate. Instructors may also include a unit on specific mark-up languages used to encode bibliographic records as well as metadata schemes used in other digital information repositories. Recent sections of basic Cataloging courses at the University of Missouri-Columbia and Rutgers University have included instruction in these metadata schemes and also in cataloging non-book formats (McCroskey, 2005; Vellucci, 2004; Moulaison, 2005). The Cataloging curriculum, if interpreted more broadly by instructors, can include aspects of librarianship that extend beyond the basics of creating a bibliographic record for a monograph.

To compare the extent to which basic Cataloging courses may prepare students for work in a networked library environment, we can look at the topics studied in Cataloging courses based on the Taylor textbook and real-world requirements of the profession. At least half of the competencies for digital librarianship set forth by Spink and Cool could be considered to

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be incorporated in the basic Cataloging curriculum, even though these competencies may not be presented as such.

Theoretical and Historical Foundations

Cataloging courses routinely trace the evolution of library organization and digital formats throughout history as a way of grounding the course in an historical context. Taylor devotes all of the second chapter of her text to a discussion of the development of current cataloging practice. Coming from this perspective, the student is better able to understand the brisk pace of change that cataloging and libraries in general are currently undergoing and they are led to anticipate a future of rapid changes in the profession.

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Technical Infrastructure of the Digital Library

As students learn to encode the MARC record, they study the advantages of controlled vocabularies and the functionality of access points in the online environment. They learn to encode the surrogate based on an understanding of the way the end-user may search. Students learn that combined precision and recall are related to effective application of controlled vocabularies. They also come to understand methods for providing keyword access to the surrogate by including notes. Lastly, they learn to anticipate user need by providing and maintaining an authority file to direct users to established forms of headings. These concepts are all addressed in Taylor's text in chapters on encoding, choice of access points, form of headings, and authority control.

Knowledge Organization in Digital Libraries

Cutter's objectives are the driving force behind the organization and representation of information in cataloging and are now interpreted to emphasize organization in an electronic environment. Taylor reprints these objectives in her introduction as fundamental for understanding the function of the catalog. Students learn to perform subject analysis, use classification schemes, and assign subject headings. Taylor devotes 4 of 20 chapters to the topic of subject cataloging alone.

Topics such as filing order in the OPAC, searchability of indexed controlled vocabulary fields, cross references, and meeting user needs could all be considered ways in which Cataloging courses teach skills necessary for knowledge organization in a digital environment. As reported earlier, it is also possible to find discussions of metadata schemes, namely the Dublin Core Metadata Initiative, appear in Cataloging course syllabi.

Collection Development and Maintenance

At each step in the cataloging process, students are reminded that the user's needs should always be kept in mind. Consideration for users and their search methods are paramount. This tenant of cataloging librarianship in its most distilled form is influenced by Ranganathan's *Five Laws of Library Science*. Students learn that cataloging is not an exercise to be carried out in rote fashion, but a way of enabling the library user to access organized knowledge.

Social, Economic and Policy Issues

Although professional catalogers and administrators are concerned with these issues, they do not appear to be a focus in Cataloging courses. Taylor does not devote a chapter to this topic.

Professional Issues

It seems that classroom instruction in cataloging focuses more on theory and practice. Taylor devotes two chapters to administrative issues related to cooperation and networking and to in-house catalog maintenance. Methodology for bibliographic instruction appears to be reserved for other courses.

Of the questions that Coleman (2002) raises about the model digital library curriculum, the one concerning the balance between "hands on" and conceptual topics could also be applied to the Cataloging curriculum. Instructors of Cataloging have discussed this topic on the

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Educat listserv. In a thread on the use of the bibliographic utility OCLC in November 2005, Cataloging instructors appear to be at the same impasse. Instructors acknowledge the need to teach tools so that students have the competencies necessary to carry out the work on a practical level. They also maintain that a theoretical understanding of the online environment and rapidly changing context in which we currently find ourselves as a profession is fundamental (2005).

Conclusion

Are we too critical of LIS education's lack of initiative in meeting the educational needs of librarians in a networked society, and specifically the needs of those working with digital collections? Should there be special programs for digital librarians or should all librarians be educated to work in a digital library environment? Should some of the traditional competencies for librarianship, such as cataloging, be recognized for the competencies it provides for work in a networked society? Should such traditional courses be required of all who intend to become librarians? Are there other educational providers that are as appropriate or more appropriate providers of DL education? It is clear that library and information studies educators are now responding to these and other related questions. But we have to wonder if, as has been the case with other issues, schools of LIS are behind the curve and instead should be looking ahead to questions that have not yet been asked to what sort of professional and continuing education is needed for the librarian of the 21st century.

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