

ANALYSIS OF COURSES AND MODULES: EDUCATION FOR DIGITAL LIBRARIANSHIP

by Terry L. Weech

Graduate School of Library and Information Science

University of Illinois at Urbana-Champaign

501 E. Daniel Street, Champaign, IL 61820 USA

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ABSTRACT: The number of courses on digital libraries taught in schools of library and information science (LIS) in the U.S. has more than doubled in the past four years. As the digital library community has grown, the importance of the contributions of library science principles has been recognized. The need for restructuring library and information science education programs to support the need for digital librarians is recognized. Yet, it appears we do not know much about what skills are needed for professionals who work as digital librarians. This paper examines the curricular trends for digital librarianship and analyzes the skills seen as desirable for librarians to have as they expand services and resources to electronic sources in the digital age. The paper also reviews current research and programs relating to competencies and guidelines for digital librarianship in the future.

Introduction:

This paper is a progress report on research on education for digital librarianship that has been undertaken to provide background information for a study funded by IFLA on exploring guidelines for educating digital librarians. It is thus a work in progress. The final results of the study are expected in the summer of 2006.

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." (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 in digital libraries, we must adopt a definition so course work and skill requirements can be identified.

For purposes of this presentation, the Digital Libraries Federation working definition is adopted. That definition is: "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 includes the functions found in most traditional libraries and seems most 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 noted 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

The term “digital library” developed from the applications of using the digital computer to store information. By the 1980s, computer science was taking the initiative in developing digital libraries. In the early 1990s libraries and library education became involved as funding for digital library projects became available. 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 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).

Spink and Cool conducted one of the first surveys of LIS course offerings in 1998 using two methods. They analyzed the websites of LIS schools to determine if courses were listed that dealt with digital libraries. They also placed an invitation on an LIS listserv on the web for people to respond with an indication 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).

A second survey on education for digital librarianship was done in 2001 by Saracevic and Dalbello (Saracevic and Dalbello, 2001). They used similar methods to Spink and Cool, but found a significant increase in the number of digital library courses 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

The third survey of courses for education of digital librarians was done in 2003 by Yan Quan Liu. 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 a grouping of elements. The three most common elements are Computer Science, Library and Information Studies, and Communication. There are a scattering of other elements, such as sociology, information technology, medical informatics, and so on. But for the most part, Computer Science and Library and Information Studies seem to have the strongest hold on what is taught for educating digital librarians.

Skills 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 libraries; 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 libraries; Costs of building digital libraries; Funding for digital environments

Professional Issues

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

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?
- 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?)

Curricular Content and Research on Educational Programs in the U.S.

In an effort to answer some of these questions, 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 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

Three current research efforts relating to education for digital librarianship have been identified to date. 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 in January of 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 in digital libraries 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.

Conclusion

Are we too critical of LIS education's lack of initiative in meeting the educational needs of digital librarians? Should there be special programs for digital librarians or should all librarians be educated to work in a digital library environment? 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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Appendix 1- Education for Digital Library Programs offered in the U.S. in 2005

University of Illinois – Certificate of Advanced Study (CAS) 6th year degree – Digital Library Concentration.

Required Courses

- 1) Introduction to Digital Libraries
- 2) Information Modeling
- 3) Design of Digitally Mediated Information Services
- 4) Information Policy

Elective Courses

- Implementing Digital Libraries - Current Topics in Collection Development
- Architecture of Network Information Systems - Document Processing
- Implementation of Information Storage & Retrieval Systems - Document Modeling
- Agents & Multi-Agents for Dynamic Information Systems
- Electronic Publishing and Information Processing Standards
- Emerging Technologies and Community Information Systems
- Information Architecture - Interfaces to Information Systems
- Information Quality: Principles and Practices
- Data Administration Concepts and Database Management



Indiana University - Master's Degree - DL Concentration

DL Concentration Course List

- Digital Libraries
- Foundations of Information Architecture
- User-centered Database Design
- Metadata
- Computer Programming for Information Management
- Network Technologies and Administration (Computer Science)
- Information Storage and Retrieval Theory
- User Interface Design
- Introduction to Human Computer Interaction
- Information Usage and the Cognitive Artifact
- Evaluation of Information Systems
- Information Policies, Economics, and Law
- Computerization in Society
- Seminar in Intellectual Freedom
- Internship in Library and Information Science



Appendix 1- Education for Digital Library Programs offered in the U.S. in 2005
- Continued:

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

Two Required noncredit classes,

- 1) Introduction to Library & Information Professions and
- 2) Colloquium of Library & Information Studies

Electives: At least twelve of the following courses:

- Human Information Behavior
- Interface Design
- Organizing Information
- Cataloging and Classification
- Metadata for Information Professionals
- Principles of Searching Reference Sources and Services
- Information Retrieval
- Automated & Networked Systems
- Digital Libraries
- Information Visualization & Presentation
- Field Experience
- Digital Library Technology
- Multimedia Production
- Management of Libraries and Information Centers
- Information Technology for Libraries and Information Agencies

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Syracuse University - Certificate of Advanced Study in Digital Libraries

Three Required Courses

- 1) Digital Libraries
- 2) Creating, Managing, and Preserving Digital Assets
- 3) Planning and Designing Digital Libraries Services

Electives:

- Information Architecture for Internet Services
- Distributed Computing for Information Professionals
- Technologies in Web Content Management
- Data Mining
- Managing Information Systems Projects
- Digital Retrieval Services
- Theory of Classification and Subject Representation
- Indexing and Abstracting Systems and Services
- Behavior of Info. Users
- Human Interaction with Computers
- Introduction to Telecommunications and Network Management
- Basics of Information Retrieval Systems
- Information Technology for Libraries and Information Centers
- Knowledge Organization Structures
- Designing Web-Based Database Systems