Convergence through Capabilities: Digital Curation Education for Libraries, Archives and Museums

Helen R. Tibbo and Christopher A. Lee; School of Information and Library Science, University of North Carolina at Chapel Hill; Chapel Hill, NC, USA

Abstract

During the past decade a growing number of practitioners, educators, and cultural heritage funders have explored the idea of a convergence of library, archives, and museum functions. The rise of digital collections and services has served as an impetus for much of this thinking along with a search for economic efficiencies and enhanced and integrated user access to materials. With the growing interest in, and actuality of, LAM convergence, there is a pressing need for educators of LAM professionals to consider how this new reality changes educational requirements and programs. This paper discusses digital curation as a promising area of convergence in both professional practice and professional education and provides a model that seeks to identify both common requirements and institutional differences. We have developed a Matrix of Digital Curation Knowledge and Competencies for identifying and organizing the material to be covered in a digital curation curriculum. The Matrix is organized along six dimensions: mandates, values and principles; functions and skills; professional, disciplinary or institutional / organizational context; type of resource; prerequisite knowledge; and transition point in the information continuum. Within the context of potential LAM education convergence, one of the fundamental questions is the extent to which offerings must vary based on the professional, disciplinary, institutional, organizational, or cultural context in which students plan to work. LAM convergence is not likely to result in complete unification, but the growing importance of digital curation activities in supporting the missions of all three types of institutions poses exciting new opportunities for collaboration in professional education.

Convergence of the LAMs

Libraries, archives, and museums (LAMs) all have ancient origins. Throughout their long histories, societies, scholars, and practitioners have viewed these cultural heritage institutions with varying degrees of overlap and uniqueness [1, 2]. In the 20th Century, libraries, archives and museums have experienced the same processes of increasing professionalization that have impacted many other occupations [3], with their own claims of autonomy [4], abstractions [5], "socialization processes" [6], organizational forms [7], professional associations, journals, and expectations about professional preparation. This has involved relatively independent paths of development, based on assumptions about distinct missions, collections, processes, workflows, and audiences [8].

Specialization within collecting institutions can promote focused expertise and direction, but it can also bring disadvantages. The segregation of collections and collecting activities can make it difficult to document complex social processes that span numerous elements of society [9], and it can result in a very fragmented user experience [10]. Divisions between the LAM professions can also inhibit opportunities for collaboration and collective learning.

During the past decade, a growing number of practitioners, educators, and cultural heritage funders have explored the idea of a convergence of library, archives, and museum functions [11]. In 1998, Rayward looked at how the transition from physical to digital collections could "lead to a redefinition and integration of the different categories of information organizations" [12]. In 2000, Dempsey et al. identified commonalities of libraries, archival institutions and museums for the Information Society Technologies programme within the European Union's Fifth Framework Programme. They used a life-cycle framework to analyze the creation, management and use of digital resources for these memory institutions [13]. Two conferences hosted by The Henry Ford in 2002 and 2004 called "Choices and Challenges" brought were designed to advance interdisciplinary communication between archivists, curators and conservators, revealing a number of cross-cutting issues [14]. A 2005 Research Libraries Group (RLG) forum *Libraries, Archives, & Museums – Three-Ring Circus, One Big Show?* [15] and the 2006 Rare Books and Manuscripts Section (RBMS) of the American Library Association (ALA) preconference, *Libraries, Archives and Museums in the Twenty-First Century: Intersecting Missions, Converging Futures* [16] both focused on LAM convergence. In 2008, staff and consultants of the Online Computer Library Center (OCLC) produced "Beyond the Silos of the LAMs," a report that presented findings from an OCLC-sponsored workshop for LAM professionals from campus and campus-like environments [17]. The report explored the potential of collaboration among libraries, archives, and museums -- especially when these units all exist within the same umbrella institution such as a university -- and presented several case studies.

Along with growing literature and discussions, memory institutions have been working toward convergence in practice. In 2000, the Museums, Libraries and Archives (MLA) Council was launched in the UK as a strategic body that replaced the Museums and Galleries Commission (MGC) and the Library and Information Commission (LIC) [18]. In 2004, the creation of Library and Archives Canada (LAC) brought together a national library and archives in one hybrid institution [19]. More recently, the library, archive, museum, and information technology (IT) staff from the Smithsonian Institution, the world's largest museum complex, have collaborated in the Flickr Commons project [20] and the IT and data management teams at Walters Art Museum in Baltimore have collaborated on the Digital Palimpset effort [21]. Activities of the Colorado Digitization Project have also cut across various types of collecting institutions [22]. Traditional bricks-and-mortar memory institutions in Germany have come together in BAM, a joint digital portal of libraries (Bibliotheken in German), archives, and museums [23].

Education for the LAMS in the Age of Convergence

With the growing interest in, and actuality of, LAM convergence, there is a pressing need for educators of LAM professionals to consider the implications of this new reality for changes in educational requirements and programs. Trant notes:

> Traditionally, libraries, archives, and museums have occupied different places in our social and informational space. The strategies they have adopted to interact with their users, and the organization and interpretation of their collections, differ and shape the definition of 'education' in and for each of these settings [24].

From approximately 1950 through 1980 most librarians have received some sort of master's degree (M.L.S., M.S.L.S., etc.) from a "School of Library Science" [25]. Many library schools changed their names (e.g. to "School of Library and Information Science") and broadened their missions in the 1980s and 1990s, some offering distinct master's degrees in either Library Science or Information Science, while others offered a combined degree. Many of these schools have now become "iSchools," educating librarians and a wide array of information professionals with curricula infused with content about digital collections and services [26].

Archivists have had more diverse pathways to professional status. Until the 1980s most archivists were educated in history departments, earning a Master's of Arts in History or Public History. The last 30 years has witnessed strong growth in the number, extent, and quality of archival education programs within LIS programs with the majority of today's professional archivists earning an LIS degree, although several archival programs within departments of history still exist [27]. Some schools offer dual LIS and History MA degree programs. The degree of focus on the management and preservation of digital content varies dramatically across educational venues and programs. The overlap of archival, library, and information science content also varies significantly [28].

Museum information professionals frequently earn their credentials in Museum Studies or Museology programs. The American Association of Museums (AAM) and the International Council of Museums (ICOM) set guidelines for museum studies programs [29] that are quite different from those that the American Library Association sets for LIS programs [30] and the guidelines of the Society of American Archivists for archival studies programs [31].

In 2008, the Cultural Heritage Information Professionals (CHIPs) workshop supported by the Institute of Museum and Library Services, Florida State University, and the Ringling Museum of Art, explored "the ability of educators to meet the information needs of cultural heritage organizations, and to encourage a closer relationship between education and practice in library and information science, museum studies, and archival studies programs" [32] especially around digital collections and services. This closer relationship, however, must retain and foster what is unique about each type of institutional setting. Trant observes:

> As all three types of institutions move toward providing access to their collections increasingly on-line, it is challenging to preserve what each institutional tradition can bring to the creation of the networked information society. The coordinated education of professionals from all three types of institutions within schools of information could contribute to a dynamic integration of these traditions and to the enhancement of professional training as currently offered for each of the separate disciplines. But coordinated should not mean identical, for many of the differences that fostered these institutions' distinct user models remain in the networked world [33].

Ray discusses the value of convergence within a user-centered digital perspective, providing an example of information needed to understand the worldwide decline in the population of large predatory sharks [34]. She explains that the "story is significant not only because it raises serious scientific, ecological, and economic concerns, but also because of what it reveals about the relevance of historical library, museum and archival resources to today's critical issues." More specifically, it reveals that researchers often need materials from all three types of institutions for any given information-seeking situation and that they want these resources in digital form. Additionally, they often value historical material to understand today's problems, thus repositories must be able to reliable preserve digital content.

Presently, users must search "the silos (catalogs) of the LAMs" separately and repeatedly. Beyond the difficulties of search, researchers frequently must travel to each repository to view the materials in person. Digitization of collections and acquisition of born-digital materials that researcher can access over the Web is but the start of a more user-oriented workflow. Users will be best served in the vast sea of information available today if repositories can provide interoperable and integrated access to a wide array of digital materials, regardless of format or origin. The task for educators is to seek overlaps and commonalities that produce educational efficiencies, repository interoperability appropriate, and optimized use, reuse and access for the diversity of potential audiences of the allied cultural heritage repositories.

Ray discusses the need to prepare "digitally savvy information professionals" and the importance of digital curation and digital stewardship. She argues:

> Knowledge of the principles and practices of digital curation can improve the ways that information is managed in cultural heritage institutions and within and across disciplines. With the cooperation of educators and cultural heritage institutions, a new class of information professionals may help to create that vast global library of universal knowledge that scholars have dreamed about since the beginning of recorded history. At the same time, increased online access to cultural heritage resources will help libraries, archives, and museums stay relevant and engage their publics in the Information Age [35].

This, of course, is a tall order. There are no simple solutions for the technological issues of digital curation, let alone the active management of digital content across its entire lifespan of usefulness. The situation becomes even more complex when one considers integrated discovery, access and use of content across material and repository types.

Education to prepare those "digitally savvy information professionals" is just at its onset. Digital curation educators are working to identify a core curriculum and understand the importance of the unique aspects of each type of cultural heritage institution. The DigCCurr I project discussed below has developed a model for the education of LAM professionals in the form of the

Matrix of Digital Curation Knowledge and Competencies that addresses the identification of core and specialized knowledge, skills, and professional acculturation.

Digital Curation Education and the DigCCurr I Project

Funded by the Institute for Museum and Library Services (IMLS), "Preserving Access to Our Digital Future: Building an International Digital Curation Curriculum" (DigCCurr I, 2006-2009) project at the School of Information and Library Science (SILS) at the University of North Carolina at Chapel Hill (UNC-CH) has developed a graduate-level curricular framework, course modules, and experiential and enrichment components and exemplars necessary to prepare students to work in the 21st-century environment of trustworthy digital repositories [36]. To accomplish these tasks, this project brought together key international figures in digital curation from Australia, Canada, Italy, the Netherlands, New Zealand, United Kingdom and United States to serve on an Advisory Board. Repositories at UNC-CH provided hands-on opportunities for the IMLS-funded Carolina Digital Curation Fellows to apply the principles that they learned in the classroom to the curation of a wide range of digital objects, including public records, cultural heritage assets, teaching materials, and research data. These Fellowships served to integrate the curriculum and the experiential components, advertise the existence of the programs at SILS, and draw attention to the need for digital curation. Two symposia (DigCCurr2007 and DigCCurr2009) brought the issues of digital curation and this curriculum to the broader library, archives, and museum communities as well as to the public [37]. Sustainability and updating of the educational products will be ensured through programmatic adoption at UNC-CH in the form of a Graduate Certificate in Digital Curation and widespread dissemination through the Digital Curation Exchange (DCE) and the library, archives, museum and information science literatures [38].

The DigCCurr Matrix as Model

A fundamental activity of DigCCurr has been the elaboration of the components and scope of digital curation. We have developed a Matrix of Digital Curation Knowledge and Competencies [39] for identifying and organizing the material to be covered in a digital curation curriculum. The Matrix is organized along six dimensions: mandates, values and principles; functions and skills; professional, disciplinary or institutional/organizational context; type of resource; prerequisite knowledge; and transition point in the information continuum. Table 1 elaborates and provides brief explanations of the dimensions.

The principles and rationale behind the construction of the Matrix were articulated early in the project [40]. The Matrix has then undergone numerous iterations, based on continuous feedback, research and analysis. Sources of data have included existing literature, content of educational offerings, interviews with domain experts, participation in educational workshops, surveys, job postings, and ongoing feedback from professionals and students [41]. We recognize that a digital curation curriculum can never be considered finalized but must instead evolve in response to experiences in implementing the curriculum, feedback on issues that require further clarification, emergence of other complementary educational offerings, as well as changes in the professional, technical and social landscape.

Table 1: Dimensions of the DigCCurr Matrix of Digital Curation Knowledge and Competencies

Dimension	Explanation
1. Mandates, Values & Principles	Core reasons why the digital curation functions and skills should be carried out and should serve as the basis for criteria to evaluate whether the digital curation activities have been carried out responsibly and appropriately
2. Functions & Skills	"Know how," as opposed to the conceptual, attitudinal or declarative knowledge
3. Professional, Disciplinary, Institutional, Organizational, or Cultural Context	Understanding of challenges, opportunities and characteristics of particular disciplines or institutions
4. Type of Resource	Types of resources that are the target of digital curation activities
5. Prerequisite Knowledge	Elements of knowledge that are instrumental to understanding and applying other aspects of the curriculum, including specialized terminology and characteristics of technologies
6. Transition Point in Information Continuum	Points of transition that span from pre-creation design and planning all the way to secondary use environments

A given curriculum unit can focus on a dimension in general or specifically as it intersects with one or more other dimensions. For example, one could teach a general unit on digital preservation (main considerations and practices), but one might also want to teach a unit specifically on preservation of video, preservation measures to be applied at the time of digital object creation, preservation in a museum context, or some combination thereof.

Within the context of potential LAM education convergence, one of the fundamental questions is the extent to which dimension 3 - Professional, Disciplinary, Institutional, Organizational, or Cultural Context - must dominate educational offerings. There are numerous digital curation skills that are likely to be necessary regardless of institutional context, such as articulating policies, provision of archival storage, planning for technological obsolescence, expressing system requirements to service providers, documenting workflows, ensuring reliable data transfer, verifying data integrity, extracting data from a removable medium, and maintaining persistent identifiers for digital objects. However, the particular ways in which the skills are applied can vary significantly across different libraries, archives and museums. The DigCCurr curriculum development efforts have focused primarily on units that we believe will be relevant to professionals across a wide range of contexts. We believe that these efforts will

complement programs and offerings that prepare students to work in specific types of institutional settings. Many programs of study, for example, offer some sort of "introduction to the profession" course that covers the origins, evolution, principles, traditions, and core literature associated with a given profession, which is often closely associated with particular types of institutional settings (e.g. museum studies; public history; library science; archives and records management). Such professional socialization is valuable for students, and the development of such courses also helps professional educators to define the foundational considerations that will drive the rest of their curriculum.

The DigCCurr Matrix is designed to support digital curation curriculum development that builds on such a foundation within particular programs of study. No two programs that offer digital curation education will be identical, because they define their offerings and priorities along different places on the six dimensions of the Matrix. As Trant notes, LAM convergence is not likely to result in complete unification [42]. However, the growing importance of digital curation activities in supporting the missions of all three types of institutions poses exciting new opportunities for collaboration in professional education.

Next Steps

The DigCCurr I project is now complete but the work of curriculum development continues under DigCCurr II, which is focused on doctoral-level education and continuing professional education. A new Graduate Certificate in Digital Curation at UNC-CH also ensures further development and updating of course work. We developed the DigCCurr Matrix within the context of an educational program that prepares individuals to work in a variety of information settings, but has traditionally seen most of its graduates gain employment in library and archival environments. Examples in our courses and the exercises students complete were created within this context. Thus far the Matrix has worked extremely well as a framework for course and module development. We have, however, less experience with museum settings and students who plan on working as information professionals within museums.

A promising next step in investigating the usefulness of the DigCCurr Matrix as a framework for teaching across the LAMs is to study Museum Studies curricula in more depth and, more importantly, to explore the tasks, workflows, and culture within museum collection management settings. More generally, we envision testing and refining the Matrix across all types of LAMs and exploring the development of digital curation materials to meet the needs of Museum Studies programs.

A promising source of further insight and guidance on these issues is Closing the Digital Curation Gap (CDCG) [43], a collaboration designed to serve as a locus of interaction between those doing leading-edge digital curation research, development, teaching, and training in academic and practitioner communities those with a professional interest in applying viable innovations within particular organizational contexts; IMLS; Joint Information Systems Committee (JISC); the Digital Curation Centre (DCC), charged with disseminating such innovation and best practices; and the Strategic Content Alliance (SCA), charged to build a common information environment where users of publicly funded e-Content can realize best value by reducing the barriers that inhibit access, use and re-use of online content. The CDCG aims to create professional resources to support the cultural heritage repository community, and especially staff in small- to medium-sized institutions in the US and UK, through researched, realistic, practical, and accessible guidance and advice. The CDCG project involves engagement with professionals across libraries, archives and museums, which provides numerous opportunities for information sharing and mutual learning. With dramatic increases in the volume, ubiquity, complexity and social value of digital information, such inter-professional activities will be essential to the success of cultural institutions.

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Author Biographies

Helen R. Tibbo, professor at the School of Information and Library Science at the University of North Carolina at Chapel Hill teaches in the areas of archival management, digital curation and preservation, appraisal, and reference. She is the PI for the IMLS-funded DigCCurr I & II, Educating Stewards of Public Information in the 21st Century (ESOPI-21), and the Closing the Digital Curation (CDCG) projects. Her research explores best approaches in implementing digital curation practices and provision of digital curation education with particular focus on workflows of content creators. She is a Fellow of the Society of American Archivists and its in-coming President.

Christopher (Cal) Lee is Assistant Professor at the School of Information and Library Science at the University of North Carolina, Chapel Hill. He teaches archival administration, records management, digital curation, and information technology for managing digital collections. His research focuses on long-term curation of digital collections and stewardship (by individuals and information professionals) of personal digital archives. He is particularly interested in the practical and ethical implications of diffusing tools and methods into professional practice.