

Cultural Heritage Informatics: Building an Interdisciplinary Master's Concentration

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The rising demand for digital information resources and services in the LAM sector has sparked many innovations by educators in recent years, as we seek to prepare students for careers in an environment that has continued to witness rapid and hard-to-predict changes. Granting agencies such as IMLS have played an important role in driving innovation to meet the needs of new professionals, in part by funding curriculum development projects within LIS schools, but also by facilitating dialogues between educators and practitioners. This work traces a 10-year process whereby one LIS school has designed and tested new courses as well as a new Master's concentration geared to the needs of LAM professionals who will be expected to work intensively with digital technologies, workflows, and collections. Through a succession of projects, some with grant funding, the school has been able to engage practitioners on an ongoing basis, enabling it to build a substantial and regularly updated body of case-study data on LAM practices, which has informed course development efforts and which has enabled the school to meet its key objectives of delivering authentic learning experiences for students and to maintain an up-to-date curriculum in an evolving area of study within the LAM disciplines. It is hoped that both the experience and the results to date will help justify continued support for innovations in LAM education.

Keywords: case studies, cultural heritage informatics, curriculum development, digital asset management, digital curation, innovation

Graduate degree programs in library and information science, archives management, and museum studies have evolved substantially in recent years, in an effort to help the LAM (library-archives-museum) professions adapt to the shifting demands of working with digital collections, services, and technologies. For the Simmons University School of Library and Information Science, a key moment occurred in 2014, when the school launched an interdisciplinary Master's concentration in Cultural Heritage Informatics (CHI). This was the outcome of a five-year development process that was driven largely by grant-funded projects, notably by the Institute of Museum and Library Services (IMLS) and the National Historical Publications and Records Commission (NHPRC). Since we have recently completed our first five years of instruction in CHI, my aim is to analyze and draw lessons from the now decade-long process through which the CHI curriculum has taken shape and evolved over time. My larger aim is to use the CHI concentration as a case example of curricular innovation in the LAM disciplines, highlighting some key factors that have influenced our work in developing CHI as an emerging area of study at Simmons. I will also point to some important milestones we have reached, and the next major steps we anticipate taking in the coming years.

Catalysts for innovation

In general, innovation demands some degree of risk taking—that is, making decisions in which the possibility of failure is greater than maintaining the status quo. In popular literature, the innovator or inventor is often portrayed as having an inner motivation toward

bold, daring (if not reckless) behavior, as with figures like Henry Ford or Steve Jobs (Isaacson, 2011). However, academic research on the process of innovation, both in technology and in organizations, has tended to emphasize the broader social, institutional, and technical factors that shape innovation, over the role of charismatic personalities. In particular, scholars of innovation (Bijker, 1995; Christensen, 1997) have emphasized the uncertain and often disjointed processes whereby new ideas have been generated, tested, and then accepted or rejected by society. Likewise, design studies have often emphasized the social dimension of innovation, as organizations establish teams to study problems and to define potential solutions, leading to the development of working prototypes and ultimately to new products or services in the marketplace (Norman, 2013). Historians of technology have analyzed innovation as a process of system building, in which the adoption of new tools and methods can best be explained by how well they fit into larger, existing socio-technical systems (Hughes, 1993). Ultimately, the question of whether a particular innovation succeeds in disrupting or in reinforcing an existing socio-technical system depends on the strategic decisions made by people and organizations in response to innovations as they appear (Chandler, 1962; McCraw, 1984), with some innovations being embraced and others resisted to one degree or other.

In the context of higher education, innovations often face sizeable organizational as well as intellectual hurdles, not the least of which is the tendency to favor established, “paradigmatic” disciplines, following Kuhn (1962), over courses that deal with pre-paradigmatic and interdisciplinary subjects such as CHI. Yet, as Kuhn demonstrates, disciplines are occasionally forced to revolutionize themselves as new knowledge or phenomena are discovered. For the LAM disciplines, the past two decades have certainly witnessed dramatic changes in technology and society, calling for new approaches and a rethinking of established methods. Nevertheless, the development of new or revamped curricula takes a substantial commitment of resources along with a willingness to experiment and to take risks with new conceptual frameworks and pedagogical strategies. Here granting agencies have often played a vital role in driving innovation by providing direct incentives to experiment and

KEY POINTS:

- Rapid changes in technologies, workflows and collections in libraries, archives, and museums have forced LIS educators to be innovative in developing and adapting their curricula. To meet the needs of a changing profession, educators stand to benefit greatly through regular communication with practitioners as well as colleagues.
- Many LIS schools have sought to define new areas of study focused on digital information and technology. In addition to creating specialist courses and programs, LIS schools may benefit by taking a balanced, interdisciplinary approach that combines digital and material collections management.
- In developing a pedagogy for digital curation, educators need to strike an appropriate balance between theory and practice, giving students a means to analyze the uses of technology by repositories. To meet this need, LIS curricula can benefit substantially by developing rich, up-to-date case studies.

test new ideas. Along these lines, in 2005 the Institute for Museum and Library Services (IMLS) added a funding category that aimed “to build institutional capacity in graduate schools of LIS around the management, preservation, and use of digital assets” (Ray, 2009). By giving the program a wide focus on “capacity,” IMLS aimed to give schools ample room to innovate around a couple of powerful, if inexact, ideas that have helped reorient LAM education toward digital information resources.

One key concept promoted by IMLS (and strongly by European funders as well) funding is digital curation, which has generally been defined as the active management of digital assets across the whole lifecycle, from the point of creation through steps taken to facilitate access and long-term preservation (Higgins, 2018). Conceptually, digital curation may be consistent with the historic mission of LAMs, yet it calls for new workflows and techniques for building and managing collections. Also, digital curation acknowledges the difference in behavior between material and digital objects, as technology forces us to address the conceptual difference between “the fixity of static information objects to the dynamics of knowledge and meaning production” (Dallas, 2016, p. 438) as it is mediated digitally, with a rapidly evolving landscape of tools and user needs.

For LAM educators, the practical and theoretical challenges inherent in digital curation might not seem like a problem so much as an opportunity to help students navigate through the uncertainties they will surely be facing as professionals. Indeed, as colleagues at the University of Michigan have noted, “one might think that digital curation would be a subject of natural interest for our students,” given the pressures felt by LAMs to prove their ability to manage and preserve it effectively. And yet “the reality is that digital curation is perhaps one of the hardest topics to teach,” not least because it requires one to be “deeply immersed in the technical challenges of digital curation” (Yakel, Conway, Hedstrom & Wallace, 2011, p. 23), a call that not all LAM students (at least at Simmons) appear eager to embrace, even those too young enough to remember the birth of the Web. In essence, digital curation—as lifecycle management of objects and collections—represents a complex concept intended to solve a complex problem.

As a locus of innovation, the concept of digital curation as lifecycle management dovetailed with a revival of the idea of convergence between the LAM professions. Especially with the need for cross-disciplinary collaboration in working with digital assets (Ray, 2009), it made sense for many to revisit the early-twentieth-century vision of such figures as John Cotton Dana, who advocated for library and museum work to be seen as part of a single mission, and with professionals trained through cross-functional apprenticeships (Given & McTavish, 2010). Dana’s idea of convergence clearly lost favor by the mid-twentieth century, as the LAM disciplines founded their own professional associations and as institutions increasingly specialized in collecting different categories of material objects. Yet today, schools like Simmons have encountered a rising number of students who are interested in pursuing internships and careers that cut across the traditional LAM boundaries, and with digital curation as a common denominator in the kinds of professional roles pursued by students. Within the structure of LAM degree programs, the idea of convergence has been revived steadily over the past two decades, with LIS schools moving to offer courses in museum studies, a list that has grown to include Illinois, Florida State (Marty & Twidale, 2011) and Kent State (Latham, 2015), among others. By contrast, Simmons thus far has been in the

category of LIS programs that have opted to incorporate museum-related topics in existing library and archives courses, with the aim of giving students an interdisciplinary perspective on LAM collections and services (Kim, 2012). In general, as Marty and Twidale (2011) have noted, "LIS educators today are focused on preparing their students to meet information needs in many different organizations" (p. 10) and with a growing demand to provide users efficient access to "ubiquitous knowledge" (Kirchhoff, Schweibenz, & Sieglerschmidt, 2008) online and across repository boundaries.

To help prepare LAM professionals to meet these complex challenges, there is a clear need for ongoing communication between educators and practitioners (Abels, Howarth, & Smith, 2016). One notable effort to jumpstart the conversation around digital curation was the 2008 Cultural Heritage Information Professionals (CHIPs) Workshop, sponsored by IMLS. This meeting brought together an eclectic group of educators and practitioners representing over 30 LAM institutions with the goal of finding points of commonality or convergence between the information disciplines. The workshop identified the need for LAMs to "add a kind of 'digital layer' on top of current library, archives, and museum educational programs and organizations," according to the CHIPs final report (CHIPs, 2008). The discussions revealed a genuine (and frankly welcome) uncertainty about what the digital layer might look like, leading to fundamental questions about the knowledge and skills needed by LAM students. To help answer these questions, faculty (including myself at the time) at the University of Arizona wrote an IMLS grant proposal entitled "Promoting Diversity in the Digital Curation Disciplines," which was funded and ran from 2009 until 2013, at which time I joined the faculty at Simmons. This grant supported the development of Arizona's certificate program in digital information (Fulton, Botticelli, & Bradley, 2011) by funding postgraduate students representing a diverse range of LAMs, and also by facilitating extensive dialogue between faculty and practitioners.

Given the practical impact of the CHIPs discussions at the University of Arizona, in 2013 my colleagues and I decided to host a Digital Curation Summit meeting, which was supported by the Promoting Diversity grant, and hosted in Washington, D.C., by Johns Hopkins University's Museum Studies program. Coming five years after CHIPs, this meeting once again brought together a mix of educators and practitioners, with the goal of defining current themes in the experiences of LAMs working with digital information. Coming at a time of rapid change in technology, particularly with the rise of mobile computing and social media, the summit discussions highlighted the need for ongoing research to enable academic programs for digital curation remain up to date. The discussions also reinforced the need to balance theory and practice in education by giving students authentic, hands-on learning experiences. In particular, the summit reinforced the idea that students should understand and be able to support LAMs in carrying out non-routine pilot or experimental projects involving digital assets, and in building the organizational capacity needed to make digital curation a routine LAM function. The summit also revealed an ongoing source of tension within LAMs as they seek to innovate in spite of having error-resistant cultures rooted in the longstanding mission to preserve material collections. The discussions suggested that some LAMs may seek to recruit new or less experienced staff members to carry out pilot projects as well as to fill perceived gaps in technology skills among existing staff.

To meet these needs, many agreed that students need to be flexible, comfortable in listening and asking questions, and well prepared to manage projects in unfamiliar situations.

Most importantly, the summit participants agreed that digital curation should be viewed as an integrative practice that combines technology, organizational, and communication skills and demands critical thinking as well as specialist technology skills. This idea was further reinforced in 2014, following my arrival at Simmons, when my colleagues and I decided to host further summits with over two dozen LAM professionals from across the region. At these meetings we encountered a number of themes in common with the earlier D.C. summit. One was the value of “soft” skills, which the participants viewed as no less important than “hard” technology skills. Broadly speaking, hard skills were viewed as an individual’s capacity to work with tools or technologies, while soft skills were seen as an individual’s ability to communicate and work effectively with people and to manage complex tasks. This discussion prompted us to think closely about how the CHI curriculum might seek an optimal balance hard and soft skills across the curriculum.

Defining CHI as an area of study

In general, the process of innovation which led to the CHI concentration depended at least as much on human factors as on the underlying changes in technology that have made digital curation a topic of concern for LAMs over the past two decades. As professional communities seek to navigate through a fast-changing, uncertain environment, a natural first step is to initiate a conversation, with the aim of generating ideas that can be tested and refined into functional concepts and plans. In the academic context, the summit conversations described above led us to frame digital curation as a practical issue—how to manage digital assets using available tools and systems—that also raises theoretical questions over how LAMs function as complex socio-technical systems. In essence, we found it useful to place digital curation within the tradition of social informatics research pioneered in the 1990s by Rob Kling (2007), among others, who argued for the value of interdisciplinary studies of how technologies influence, and are influenced by, the varying social contexts in which they are used by people and organizations. For Marty (2009), it was not difficult to translate social informatics to the domain of museum studies, with the resulting formulation of museum informatics acting as “the study of the sociotechnical interactions that take place at the intersection of people, information, and technology in museums” (p. 3717). While Marty was concerned specifically with museums, we found that informatics can be just as useful in studying the impact of technology on archives and special library collections. Hence, at Simmons, we adopted “cultural heritage informatics” as a concept that embraces convergence, by giving equal coverage to the LAM disciplines, and leaves room for curating material as well as digital collections, as “heritage” worthy of access and long-term preservation.

With a basic conceptual framework in place, our next major step in designing the CHI concentration was to flesh out the CHI curriculum. This effort was advanced by an IMLS grant (awarded in 2009) entitled “Curriculum, Collaboration, Convergence, Capacity—Four Cs for the Development of Cultural Heritage Institutions: Libraries, Museums and Archives in the Twenty-First Century,” the main goal of which was to design coursework for CHI with a strong emphasis on hands-on learning with digital as well as material collections. The grant

enabled Simmons to work closely with a diverse range of cultural heritage institutions to design field experiences as well as case studies involving collections, workflows, and current technologies. A key finding was that as much as students benefited from field experiences in LAMs, they also valued the opportunity to study LAMs from a holistic point of view, examining the histories, collections, user communities, organizational structures, and collection management technologies used by institutions (Bastian, Harvey, Mahard, & Plum, 2010). Most importantly, the grant showed the need for students to develop their critical thinking skills; for us, this meant trying to strike the right balance between theory and practice. In the classroom, we can readily describe digital curation as “the creation of durable digital objects and on their maintenance over time,” yet in reality, the LAM disciplines are still relatively early in the process of “understanding of how these digital objects are likely to be used in the future, how users will require them to perform, and what infrastructure needs to be in place in cultural heritage institutions to ensure their usability in the future” (Bastian, Cloonan, & Harvey, 2011). To prepare students adequately for careers in a changing environment, we realized early on that the CHI courses would have to focus at least as much on problems as on solutions for managing digital assets, which in many cases have yet to be invented. Another fundamental issue involved the need to examine how the mission of LAMs has continued to include both the “preservation of the tangible (monuments, buildings, works of art, books, documents) and the intangible (customs, beliefs, lore, unrecorded music, language)” (Cloonan, 2018). This view matches wider calls for a broader, more pluralistic view of cultural heritage as it is collected and preserved by LAMs (Bastian, 2009), a view that is surely consistent with the rise of digital culture and a renewed interest in the idea of convergence by LAM professionals, with digital technology providing a common means of accessing varied types of collection objects while at the same time maintaining “an understanding of and respect for the differences between libraries, archives, and museums” (Trant, 2009).

Structuring the CHI concentration

As Simmons moved toward the formal launch of the CHI concentration in 2013–14, we drew heavily from the outcomes of the Cultural Heritage and Digital Curation grants in an effort to build a curriculum that would emphasize authentic learning and that would strike an appropriate balance between hard and soft skills. We were strongly committed to interdisciplinarity, with all students expected to acquire at least a foundational knowledge of core theoretical concepts from each of the LAM disciplines, and with a generalist perspective on where the disciplines intersect as well as where they differ.

In mapping out course requirements for CHI, it quickly became apparent that we could leverage the substantial degree of convergence that was already present in Simmons's course catalog. The Simmons degree program mandated three core courses with a strong library focus, covering information organization, user services, and library technologies. Building on this foundation, we opted to require CHI students to complete the introductory archives management course, giving students a grounding in archival fundamentals and also paving the way for students to take advanced archives courses as electives. Simmons also offered many non-archives electives with direct relevance to CHI, including advanced courses on metadata, special collections librarianship, and technology.

Even with the established courses available, we found it necessary to create three new courses to fill out the CHI requirements. First, we sought to fill an important conceptual gap in the Simmons catalog—namely, an introductory course with a museum focus. Our initial solution to this problem was to create a new required course (named “Concepts in Cultural Heritage Informatics”), which would examine the history and evolving mission of LAMs, highlighting points of commonality as well as differences between the major institution types, and including substantial museum-related content. Initially, at least, we did not want Simmons to compete directly with museum studies programs but rather to position Simmons students to apply the knowledge and skills gained in LIS and archival studies to the practical issues facing museums as they seek to manage a fast-growing body of digital assets. Still, in recent years we have been struck by the demand among Simmons students for at least one museum-specific course, and especially given Simmons’s close geographical proximity to major museums, we have been eager to expand our offerings in this portion of the LAM triad. Hence, 2020 we launched an introductory course on museum studies, which is taught in conjunction with Simmons’s undergraduate programs in art history and arts administration. Within CHI, we will initially treat museum studies as an elective, but we are also considering ways to include the course in the list of CHI requirements.

Another essential component of CHI is the preservation requirement, for which students are able to choose between two courses: Preservation Management and Digital Stewardship. The former course pre-dates the development of CHI and is designed to give students a comprehensive look at preservation programs, planning activities, and conservation methods used in the LAM sector. The course includes a digital component, yet the majority of the course content focuses on preserving material collections. For this reason, as CHI took shape, we decided to design a new course with an exclusively digital focus. As a course on digital “stewardship,” as opposed to on preservation per se, the new course aimed to cover the full information lifecycle, following the core idea behind digital curation—as the process whereby information resources are managed from the point of creation, through steps taken to facilitate access, and culminating in the actions needed to ensure long-term preservation. Using this conceptual framework, the Digital Stewardship course gives students hands-on learning experiences in creating digital objects of sufficient quality to serve as preservation master files. Students also build online exhibits, which add contextual metadata to their objects and collections. Finally, they assess preservation risks and experiment with varying strategies for preserving their collections as potential risk factors arise in both the near and long term.

Designing a CHI capstone course

Finally, to round out the CHI requirements, we decided to create a new advanced course called Digital Asset Management for Libraries, Archives, and Museums (“DAM for LAMs” for short), which was intended to serve as a capstone experience for CHI. The new course was intended to give students an in-depth field experience through which they would gain project management skills while studying digital collections, workflows, and technology use cases through direct interaction with professionals working in a wide variety of LAMs. The development process for DAM for LAMs raised a number of theoretical as well as practical

issues, particularly as the course description called for a deeper level of analysis than might be expected in a conventional practicum or internship. At the most basic level, I found it challenging simply to define “digital assets” in a LAM context, as the term is often used by non-LAM organizations to describe a wide range of digital objects (e.g., photo collections produced by commercial firms), which have come to be served by a variety of commercial software products labeled as “DAM” systems. From a LAM perspective, my experience with the course has shown that the basic question of what constitutes a digital “asset”—as a digital object with lasting value—is a complicated one in practice, as many LAMs have come to own a large and varied body of digital objects, including surrogate images and other object types used to document the institution and its collections. Indeed, as I fleshed out the syllabus, I found that the decision (made before my arrival at Simmons) to use DAM as a guiding concept for the course gave students as well as the instructor much room to explore a relatively immature area of study, as opposed to a more conventional capstone course in which students are expected to apply well-established concepts from more introductory courses.

Given the rapid pace change and uncertainty surrounding DAM as a topic, I found it helpful to focus the course on equipping students to analyze digital assets from a distinctly empirical perspective, using case studies to examine the assets themselves along with the technologies and workflows used by LAMs to manage their digital collections. This approach built directly on the results of the Four Cs grant, which had demonstrated the value of case studies as a means to help students understand the differences as well as the commonalities between LAMs as they approach the complex work of collections management. Also, for myself personally, a case-centered pedagogy had the advantage of complementing my previous work in preparing business cases for use in the distinctive case-based pedagogy pioneered and long used by Harvard Business School (Botticelli, 1997). In fact, case-based coursework was not a new phenomenon at Simmons or in other LIS programs, with precedents going back at least to the 1950s (Anderson, 1981; Galvin, 1963; Shaffer, 1959).

Most importantly, for CHI as a whole, the adoption of a case-based pedagogy for DAM for LAMs was intended to give students an opportunity to apply the concepts and skills gained in the other required courses. For instance, the Digital Stewardship course includes exercises using instances of Omeka as a controlled lab environment in which students can build digital exhibits (Botticelli, Fulton, Pearce-Moses, Szuter, & Watters, 2011). At Simmons, we have used Omeka in a number of courses and found it to be a useful tool for students to learn to work with digital objects at an introductory level. However, in building an advanced course for CHI we needed to find a practical way for students to experience the wide range of systems and tools commonly used by LAMs in their complex and often idiosyncratic workflows—conditions which are difficult to replicate in an authentic way in a university lab designed for teaching rather than production work with large volumes of digital assets.

To help students understand the complexity of DAM in the field, I devised a pedagogical model that emphasizes both applied research and the communication and project management skills that LAM professionals themselves need as they go about planning, implementing, and evaluating digital workflows. The value of case studies was that it provided a way for students to analyze the complex and dynamic socio-technical environments found even in many large and small repositories today. This approach followed a similar

rationale to that of Costis Dallas (2016), who has argued that the study of digital curation should be grounded in the “actual practices of curation in a diversity of contexts and on associated actors, objects, processes, and infrastructures” (p. 440). I would add that by giving students a realistic view of DAM as it is actually practiced in a local environment at a given time, we can give them a foundation of knowledge that can help them adapt successfully to the steadily changing institutional landscape we have seen in the LAM sector over the past several decades (Marty, 2007).

In this context, my biggest goal for DAM for LAMs has been to promote critical thinking about technology and the evolving role of digital assets within LAM repositories. In an effort to make the course content as timely and hands-on as possible, I designed the syllabus around a structured progression of assignments which would guide students in building their own case studies of digital assets in LAMs. Through the course of the semester, students gather data on selected repositories, using a standard set of research questions that includes the institution’s existing digital assets, workflows, policies, and technologies, as well as questions of how digital collections fit each institution’s history, mission, organizational structure, and current strategic plans. Students are instructed to make at least one site visit, and they are required to conduct a minimum of one semi-structured interview with a LAM professional responsible for digital assets, though most students conduct multiple interviews. Some students have been able to leverage their projects to build upon existing relationships gained through previous internships, while others have had success starting with “cold calls” to institutions—a welcome testament to the willingness of LAMs to share their knowledge with those seeking to enter the profession. At each step of the case development process, students are expected to reflect on what they have learned and to share their results with the class. They also give formal presentations on their project results, along with extensive written reports that include raw data (e.g., interview transcripts) along with their case narratives and reflections.

In the first five iterations of the course (it has been taught each spring since 2015), Digital Assets students had completed 63 case studies on 57 different LAMs, with six cases examining different units within a single institution. In an effort to code the institutions by type, I found that students had constructed a sample that includes 19 libraries (33% of the total), 15 museums (26%), 7 media and performing arts organizations (12%), 6 archives (11%), 6 historical societies (11%), with the remainder (7%) including two government agencies, one trade association, and a digital humanities network run by university-based academics outside of a formal LAM structure. The list of institutions we have studied also varies dramatically in size, from large research institutions to small, mostly volunteer-run historical societies. With such a varied sampling of institutions, it comes as no surprise that we have encountered a wide range of collection types, including minerals, film prints, textiles, biology specimens, and ship design blueprints, along with familiar LAM types such as correspondence, maps, photographs, and, of course, books. The cases also show much variety and complexity in the tools used by LAMs to manage digital assets. My initial coding of technologies mentioned in the cases reveals no fewer than 71 different systems used by the 57 institutions studied thus far. Of these, 33 (46% of the total) are proprietary DAM or content management systems (e.g., Widen) and 14 (20%) are open-source applications

supported by third-party organizations (e.g., Omeka). I coded the remaining 25 systems (35%) as “homegrown” insofar as they represent locally customized software applications and toolsets. This category calls for additional study, as it includes complex institutional websites, databases, and a wide range of proprietary as well as open-source tools used to support particular workflows.

In general, the cases reveal a highly pragmatic and inventive use of technology by LAM professionals, which reinforces the idea that DAM may best be understood as a complex socio-technical phenomenon that is likely to be carried out in different ways depending on the human and organizational dynamics at work in a given institution. Moreover, the case studies represent institutions at every conceivable stage in the process of developing digital workflows and infrastructures. As the body of cases continues to grow, my aim is to generate enough data to make detailed qualitative comparisons between institutions and ultimately to draw useful insights on larger patterns in the adoption of new technologies and digital workflows across the LAM sector. In any case, by producing and sharing their cases, students in DAM for LAMs have been exposed to qualitatively rich and up-to-date information on the professional roles they may expect to play in managing digital assets in the near future. The cases have revealed useful insights on key strategic decisions made by LAMs as they have gone about managing collections and in developing their digital infrastructures and services. For instance, we have encountered many cases that highlight the theme of collaboration across institutional lines as well as involving different units within repositories. We have seen examples of how individual LAMs have set priorities for digitizing material collections and created metadata for access purposes. Many of the cases detail the process of evaluating and selecting technologies for use in processing digital assets and in building the infrastructures needed to support online access. Digital preservation also features in the cases, although the course has revealed significant gaps in this area, especially outside of larger and relatively well-funded research institutions.

On the whole, the cases generated by DAM for LAMs have produced useful data showing how many institutions, large and small, have made progress in their efforts to start up, expand, and sustain DAM-related activities, even when faced with a minimum of technical and organizational resources, as in the case of small repositories in which staff have to take on multiple roles. Just as importantly, for Simmons the course has been a useful experiment in curricular innovation as we continue to develop and refine the CHI concentration. One key lesson has been that in evaluating student learning, especially in an emergent or non-paradigmatic field of study, both students and faculty have benefited by focusing the coursework on hands-on projects that lead to concrete products—including both the raw data and the case reports generated by students in DAM for LAMs, and the online exhibits produced by students in the Digital Stewardship course. We have also found promising results by emphasizing the development of project management and practical technology skills, but not as a substitute for learning theory; rather, our goal has been to look for opportunities through which students can learn to apply theoretical concepts to the practical situations they are likely to encounter in the workplace. For faculty as well as students, CHI has been very much an exercise in project management, as we have worked

to build and refine a curriculum that needs to be flexible and able to accommodate both new and revised courses on a routine basis.

Conclusions

As we look to the future of CHI, it is evident that the LAM sector continues to be in a state of flux, as digital technologies continue to evolve at a rapid rate and as institutions continue to identify and fill gaps in existing digital collections and services. In our efforts to prepare students for successful careers in an uncertain environment, our efforts to update the Simmons curriculum have meant committing ourselves to innovation, initially motivated by grant funding and more recently through the momentum generated by our students' interests and educational needs. In building the CHI concentration, we have sought to align our curriculum development work—particularly our experimentation with hands-on pedagogical strategies—with our applied research efforts, as reflected in the case studies developed by CHI students and in a number of faculty publications that have been informed directly by our teaching in this area. Also, in developing CHI we have made it a priority to integrate our teaching and research with our faculty service efforts, especially through outreach projects intended to foster regular communication between practitioners and educators. The result has been an ongoing effort to build and refine the CHI concentration to reflect the current technologies, workflows, organizational strategies, and digital asset types we can observe in the field. To be sure, the CHI concentration remains very much a work in progress, mirroring the ongoing changes within LAM institutions as they adapt their traditional, material-based missions to the demands of the digital age. As we look to the near future, it is safe to assume that the CHI concentration will continue to be viewed more as a locus of innovation than as a stable, paradigmatic area of study—at least until technology and digital collections become a routine practice for the LAM professions. As the socio-technical environment continues to evolve, we can expect new problems and ideas to arise and spark discussion, leading to further experimentation as LAM institutions seek to adapt to changing conditions while remaining true to their social mission. Given the ongoing need for innovation, LAM educators will surely continue to play an important role in preparing students and in helping to shape the concepts and methods employed by LAMs in the digital age.

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