Developing a Specialization for LAM Convergence Using a Competency-Based Approach in an LIS Graduate Curriculum

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This article describes the development of a curriculum specialization, Cultural Heritage Information Management (CHIM), at a library and information science (LIS) graduate program. It was designed to address market needs, created by the convergence of practice in libraries, archives, and museums (LAMs) of emerging practices in managing unique collections for greater access in today's digital information environment. A competency-based approach was adopted to ensure that students achieve relevant competencies expected in the work environment of the LAM sector. The course of study serves as a guide for career preparation in the CHIM area, by listing core courses, highly recommended courses, and electives. The article discusses processes involved in the development and implementation of competencies into the curriculum reorganization, and benefits observed from the process, offering an example of adopting the competency-based model to organize a specialization.

Keywords: competency-based curriculum, LAM convergence, LIS education, outcomes assessment, specialized curriculum development

Under constant challenges such as technological advancement, financial pressures, and users' demand for instant information access, memory institutions like libraries, archives, and museums (LAMs) have been embarking on the digitization of their physical collections, transitioning to the provision and access of digital representations on the networked digital environment (Robinson, 2012). The trajectory of information provision and access on the networked environment led to changes in professional practices, facilitating working together across traditional boundaries despite differences in professional traits and culture (Allen et al., 2017; Bastian, 2017). This trend is often referred to as LAM convergence. The phenomenon of LAM collaboration and convergence has been discussed extensively in literature (Marty, 2008; Robinson, 2012; Waibel & Erway, 2009; Zorich, Waibel, & Erway, 2008). Via collaboration and cooperation, memory institutions attempt to broaden audiences, gain support from communities, preserve their cultural records, and remain relevant in the changing environment. As Duff, Carter, Cherry, MacNeil, and Howarth (2013) reported, professionals working in the LAM sector indicated that their practice and collaboration are inevitable "to serve users better; to support

scholarly activity; to take advantage of technological developments; to achieve budgetary and administrative efficiencies; to understand digital surrogates as objects, and to obtain a holistic view of collections." This trend also triggered an emergence of new required roles and responsibilities of professionals to adjust their skills and abilities, in order to provide services for their users and assist in fulfilling the institution's mission while maintaining traditional roles (Manning & Silva, 2012).

KEY POINTS:

- A specialized curriculum is inevitable for supporting the changing practice of LAM professionals. A set of competencies and detailed outcomes for LAM practice is required to illustrate what aspects a curriculum needs to touch upon and how it ensures a balance of topic coverage within the curriculum.
- In the course of the curriculum development, thorough planning and a systematic process is key to the success of curriculum implementation and sustainability.
- A competency-based education model can be adopted for curriculum development, as it demonstrates attainment of the competencies among students.

As the practices of libraries, archives, and museums converge and new requirements for the practices have emerged, the need to educate a new generation of information professionals prepared to succeed in these memory institutions becomes clear. The Cultural Heritage Information Professionals Workshop,[1] for example, addressed this need. Researchers (e.g., Howard, 2015; Ray, 2009; Trant, 2009) have called for changes in the education system to produce professionals ready to address new challenges in managing cultural heritage information. As the convergence of LAMs becomes a growing topic of interest, Marty and Twidale (2011) emphasize the importance of offering guidance in course selection to LIS students who are interested in this career path. Additional literature (e.g., Given & McTavish, 2010) demonstrates the need to coordinate education in this field. Several LIS schools have offered new curricula, specializations, and continuing education programs to meet this need (Aparac-Jelušić, 2015; Bastian, 2017; Kim, 2012; Latham, 2015; Marty & Twidale, 2011). More specialized curricula are essential to help students gain expertise in related areas.

Located in Washington, DC, surrounded by many memory institutions in the form of libraries, archives, and museums, the Department of Library and Information Science at the Catholic University of America (CUA-DLIS) witnessed cultural institutions already experiencing the convergence, such as the Smithsonian Institution and its Biodiversity Heritage Library initiative (Kalfatovic, Kapsalis, Spiess, Van Camp, & Edson, 2008). Equally, our stakeholders called for a curriculum embodying coherent

courses of study that integrate the current changing practice of LAMs within LIS curricula. While the program had offered courses related to cultural heritage information management, including special collections, archives management, preservation, and art and museum librarianship, we recognized a need to reshape a curriculum for the learning experience of students in response to changes in professional practice taking place. As a result, the CUA-DLIS program took action to make the curriculum amenable to changes by launching a new concentration in Cultural Heritage Information Management (CHIM) for the Master of Science in Library and Information Science program in 2011. In doing so, the program adopted a competency-based education model to develop a specialization, as it focuses on connecting the curriculum to the practice and assurance of student attainment of relevant knowledge and skills (Nodine, 2016). The purpose of this paper is to describe an approach to reorganizing and implementing a curriculum by adopting a competency-based education model to support LAM convergence in a master's degree in library and information science.

Overview of competency-based education

Competency-based education (CBE) was introduced in US higher education programs for teacher training and vocational education in the 1960s (Nodine, 2016). A competency-based education model has been widely adopted for professional education, the goal of which is to provide students with skills, abilities, and qualities needed in entering a workforce, although it is still an evolving field with no universally shared definition of what makes a model competency-based (Gervais, 2016). However, it recommends a few essential steps for the development and implementation of a curriculum beginning to conceptualize competencies, mapping competencies to courses, and assessing learning outcomes (Johnstone & Soares, 2014). Since a competency-based approach in an educational program requires the demonstration of attainment of the competencies among students, it is known to improve the match between educational performance and employment opportunities (Fan, Wang, Chao, Jane, & Hsu, 2015; Gervais, 2016; Nodine, 2016). In LIS education, Kim (2015) reports an approach to curriculum development in digital curation based on a competency-based education model at the University of North Texas. For a background on competency-based education, readers are referred to Kim's (2015) paper.

The curriculum-development process

As the reorganization of a curriculum at CUA-DLIS was attempted due to the changing work environment of the LAM sector, it was logical to adopt a competency-based education model to ensure that our curriculum would provide students with relevant competencies to become professionals in their area.

Defining competencies for a curriculum

An essential part of the process in CBE is to define what competency means within the LAM context.

Reviewing professional guidelines

The development of competencies should be aligned with professional expectations and practice (Johnstone & Soares, 2014). Several professional organizations, including the American Library Association (ALA), the Society of American Archivists (SAA), the Rare Books, Manuscripts and Special Collections (RBMS) Section, the Special Libraries Association, and the American Alliance of Museums, outline a set of professional competencies, standards, or guidelines, characterizing the common knowledge, skills, and abilities expected and required for practice settings. The faculty consulted the competency recommendations of such professional associations.

Reviewing the literature on LAM training

The faculty reviewed a body of literature published on the new roles, requirements, and skills of professionals in LAMs to identify important competencies. In transitioning information access and services into the networked environment, libraries, archives, and museums focused on building, managing, and sharing digital collections as an essential innovative activity (Borowiecki & Navarrete, 2017). They put more effort into making their collections broadly available online by undertaking digitization programs, acquiring born-digital materials, and employing digital strategies (Smithsonian Institution, 2009, 2010; Stack, 2010, 2013). The development and management of digitized and born-digital collections bring changes to resource management and professional practice. In fulfilling the related professional responsibilities and roles, information professionals in LAMs are expected to have relevant knowledge and skills in the collection, selection, management, long-term preservation, and accessibility of digital assets, as well as relevant technologies (Bastian, Cloonan, & Harvey, 2011; Cloonan & Mahard, 2010; Duff, Cherry, & Sheffield, 2010; Sula, 2013).

By adopting the Delphi method, Howard, Partridge, Hughes, and Oliver (2016) investigated and identified the skills and knowledge required of an information professional in a converged environment. They identified the specific knowledge and generic skills that were required, including problem solving, critical thinking and critical analysis, written and oral communication, adaptability and leadership; an understanding of systems, including databases and other content management systems; an understanding of information architecture; skills and knowledge of cataloging; and knowledge of policies and adherence to standards. Knowledge and application of each respective professional association's Code of Practice were also important for libraries and archives. Duff and her colleagues (2013) also noted that professionals need a good understanding of the

different professional traits and organizational culture, as well as the ability to work in teams in order to work around the collaboration and convergence projects.

Cultural resources are unique as well as diverse in terms of their context and potential meaningful use. In order to develop and implement digital collections of cultural resources to promote effective and meaningful use, understanding and considering diverse user groups and their needs is imperative. Overall (2009) argues that greater understanding of cultural issues is vital among information professionals and that human information behavior should be a core competence that LIS professionals must develop, as cultural competence would help professionals improve information services. Thus it is critical for professionals working in LAM convergence to have a knowledge and an understanding of the needs of diverse populations in order to deliver valuable services.

The literature indicates that in supporting change in LAM work settings, professionals are expected to have competencies in the acquisition and curation of objects and information; a knowledge of information organization; an understanding of user needs and information service provision; an awareness of changes and phenomena around institutions and the profession; an ability to collaborate with partners across departmental, institutional, and disciplinary boundaries; and expertise in digital technologies.

Composing a competencies and outcomes statement

Based on the expectations of professional work in LAM convergence described in the literature, five competency areas were determined as key desired domains of the underlying knowledge base and subject content that students are expected to gain from their education. In each competency, intended learning outcomes were formulated to further address indicators of the competency to describe intentions about what students should know, understand, and be able to do with their knowledge (see Table 1). Therefore, statements of competencies and intended outcomes represent expectations of what a student is to learn, thus functioning as a conceptual foundation for the intended curriculum. These statements and outcomes were presented to the program's advisory board group, consisting of professionals working in the LAM sector and full-time faculty, for their input and approval on the knowledge, skills, and practices required for student learning.

As the essential foundation for our CHIM curriculum, the five competencies (FROST) are as follows:

1. "Historical and contextual foundations (F)" represents the knowledge and understanding of the culture, context, and collections of cultural institutions.
2. "Resource management and digital curation (R)" implies the knowledge in developing, curating, managing, and evaluating data and information resources in all formats.

Table 1: Intended outcomes of each competency

Competency	Intended outcome statement: Students will be able to
Historical and contextual foundations of cultural heritage institutions and profession (F)	1. Understand the culture, context, and collections of cultural institutions. 2. Articulate the interrelationship among libraries, archives, museums, and cultural heritage institutions. 3. Become cognizant of the convergence of cultural heritage institutions in practice and operations and new best practices for collecting, managing, and providing access to cultural materials. 4. Understand the management of nonprofits and the challenges faced by these institutions. 5. Develop grant proposals and manage projects at cultural heritage institutions. 6. Develop new services and new approaches in meeting user needs.
Resource management and digital curation (R)	1. Demonstrate fluency in the theory, standards, and best practices of information selection, acquisition, disposal, organization, evaluation, storage, preservation and conservation of cultural resources in all formats, including digital, within libraries, archives, and museums. 2. Obtain planning and management skills in activities of resource management and curation.
Information organization (O)	1. Understand conceptual frameworks for organizing and retrieving information resources, including metadata schemas, classification systems, taxonomies, standardized terminologies, controlled vocabularies, standards for data sharing and approaches for interoperability. 2. Be capable of developing information representations of archival and cultural resources, and have expertise in metadata standards, classification schemes, taxonomy, and controlled vocabularies.
Information service provisions (S)	1. Analyze the needs of users so as to design and evaluate products and services to meet those needs and advance their institution's missions and values. 2. Demonstrate their ability to develop new programs and strategies/activities to enhance user experience.
Digital technology (T)	1. Understand digital technologies and their potential for advancing the mission of cultural heritage institutions. 2. Utilize technological tools for the delivery of content and services; create information systems designed to mediate between cultural resources and the users of those resources; and work with digitization technologies to create and manage digital representations of resources. 3. Apply information-organization principles and interface-design principles to create user-friendly digital collections and websites; and conduct usability testing. 4. Develop the ability to manage projects involving digital technologies.

3. "Information organization (O)" encompasses the practice for resource description, content structure and information discovery.
4. "Information service provisions (S)" characterizes the skills of students in analyzing the needs of users so as to design and evaluate products and services to meet those needs and advance their institution's missions and values.
5. "Digital technology (T)" indicates an understanding of the utility of technological tools for the delivery of content and services, and the skills to work with digitization technologies to create and manage digital representations of resources for advancing the mission of cultural heritage institutions.

Mapping competencies to courses and resulting curriculum structure

The department offers one master's degree program with several specializations. The program has already offered courses providing knowledge and skills applicable to the professional fields of archives or museums. Therefore, the next step we took was to survey and map the existing courses, other than core courses, to the competencies. In doing so, faculty focused on what existing courses were relevant or needed to be enlarged in order for students to gain the required competencies and learning experiences. A critical review of the existing courses' coverage and structure was conducted based on course syllabi.

From the review process, a set of highly relevant courses was identified as being most appropriate for providing students with the necessary background, skills, and abilities to become successful practitioners in LAM work settings. Those courses are the "Metadata" course for the information organization competency, the "Foundations of digital libraries" course for the digital technology competency, and the "Human information behavior" course for the information service competency. During this process, the faculty recognized a need to develop new courses to address two competency areas—the history and contextual foundation of the LAM sector and the digital curation of managing digital assets. As a result, two new courses were developed as a new addition to the CHIM curriculum: "Theory and history of cultural heritage institutions" as a primary course to characterize the boundaries of the LAM sector in organizational, occupational, and social contexts, introduce theories related to museum practices in particular, and address skills to meet short-term and future goals and the demands of a changing workforce; and "Digital curation," to help students conceptualize data creation, format, and dissemination as well as data storage, preservation, and access for digital assets based on the curation life-cycle approach. The coverage and structure of these courses for the CHIM concentration were also reviewed and approved by the faculty and the advisory board.

During the course of reviewing existing courses, a set of relevant courses was also compiled and collated within further functional areas of

Table 2: A list of other electives to support different career paths

Settings (management & resources)	Services/outreaches	Technology
• Preservation • Archive management • History of the book • Management • Special collections • Rare books • Art and museum libraries institute • Cataloging and classification • Copyright and licensing institute • Collection development and management	• Oral history • Information literacy and instructional design • Public programs, outreach, and digital exhibits in libraries, archives, and museums • Marketing • Visions of Italy (study abroad)	• Database design and management • Information architecture and web design • Design and production of multimedia • User interface design and evaluation • Programming for web applications

practices (technology, services, and outreach) and settings (special collections, archives, or museums) (Table 2). These courses could serve as additional electives for further relevant career pathways.

As a result of the course mapping exercise, the curriculum was formed as a three-tier arrangement. The first tier is a set of four core courses to offer common foundational elements of library and information professional fields. As required courses for the degree program, the core courses (Organization of Information, Information Sources and Services, Information Systems in Libraries and Information Centers, and The Information Professions in Society) have been developed to map for general competencies built around those listed by professional organizations, including the ALA's core competencies of librarianship.[2] By taking these required first-tier courses, students gain foundational knowledge of the general competencies in library practice. The second tier consists of a set of highly relevant courses aligned to the CHIM competencies, helping students build a common ground of knowledge and skills for LAM convergence. Within the third tier, students have options to take additional electives related to their future career interests in different institutional types or functional areas of practices.

Demonstrating competencies and learning outcomes

The competencies and intended outcomes of CHIM are stated as a description of what students should know and be able to develop. They serve as a guide for instructors to establish the scope of subject content and learning tasks to demonstrate results of learning. Spady (1994, p. 2) defines outcomes as "clear learning results that we want students to demonstrate at the end of significant learning experiences . . . outcomes

are what learners can actually do with what they know and have learned, outcomes are actions and performances that embody and reflect learner competence in using content, information, ideas, and tools successfully." Driscoll and Wood (2007) categorize learning outcomes into four dimensions—knowledge outcomes, skills outcomes, attitudes and values outcomes, and behavioral outcomes—mapped to the well-known Bloom's taxonomy of learning. Knowledge outcomes represent whether students learn something new like core concepts, principles, a broad history, or disciplinary techniques; skills outcomes are related to knowing how to do something or skills for effective practice in particular professions; attitudes and values outcomes focus on belief, values, or ethical principles of individuals, the profession, or society; and behavioral outcomes are related to performance or contribution. Driscoll and Wood emphasize that instructors should develop learning activities to facilitate students' attainment of different dimensions of learning outcomes. Instructors therefore make an effort to provide various assignments to measure student performance in different areas of learning outcomes based on the competency statements.

For example, the "Foundations of Digital Libraries" course was aligned as a primary course to demonstrate the technology competency and its intended outcomes. In order to achieve the competency, an instructor designed learning modules to shape the learning process with subject content and skills and formulated specific learning objectives. Learning modules included conceptual overviews of digital library development, collection building, organization and representation for information access, systems and information architecture, and project planning and management. Multiple tasks were given to students, including writing a case study of digitization projects, developing a digitization guideline, building a digital collection using a digital content management system as a team-based project, and conducting usability testing. The emphasis in developing learning tasks was on having students demonstrate both the capabilities of knowledge integration in action and an engagement in relevant practice of digital technology applications within the LAM context. For example, students completed an assignment that involved building a digital collection of hidden materials at a local institution, resulting in the production of something that was actually used by the institution and its users. Students' tasks included written reports, presentations, and a website of digital collections. Table 3 presents learning tasks, desired outcomes, and an alignment to competencies and intended outcomes of the course design.

Student performance on these tasks was measured with a rubric, which is a very common tool to specify outcomes and levels of outcomes (learning results); for example, 1= failing to meet expectations, 2= meeting expectations, and 3= exceeding expectations. Each rubric could include different traits to assess specific aspects of qualities and capabilities relevant to the performance. By using the rubric, an instructor was able to assess if desired results were met. From the case-study assignment, the rubric

Table 3: Course learning strategies for performance assessment

Tasks for students	Elements of student learning	Desired results	Alignment of intended outcomes in competencies (from Table 1)
Writing an investigative case-study report of digital projects within the LAM context	Conceptual frameworks and elements of digital library development	Knowledge outcomes; intellectual skills (ability to adopt a conceptual framework or principle in investigation); attitude outcomes (ability to gain awareness of the professional value and contribution to society)	*T1* *F1*
Developing a digitization guide based on best practices for content conversion and preservation	Standards Best practices Conversion tools used in digitization	Knowledge outcomes; intellectual skills; problem-solving skills (ability to develop a practical approach in solving problems); behavioral outcomes (ability to use related technology tools)	*T2* *R1*
Building a digital collection with further subdivided activities: writing technical reports on collection development policy, digitization guide, and metadata profile, and conducting usability testing	Digital content management systems Principles and concepts of collection development; information representation Project planning and management Cultural competencies of understanding users and techniques of usability testing	Knowledge outcomes; intellectual skills; problem-solving skills; behavioral outcomes (leadership skills, project management skills; teamwork; ability to use tools); affective outcomes (ability to learn about values of professional practice or diverse values and preferences of individuals)	*T2,T3,T4 (cross-related outcomes: F1, R1,O2,S2)*

results indicated the mastery level of the competency achieved: 76.5% (13 students out of 17 students) demonstrated a high level of integration of a conceptual framework of the digital library into the practice of digital collection building (exceeding expectations).

There was a set of five primary courses to address the CHIM competencies. Table 4 presents course descriptions and a sample of learning activities for performance assessment from these five courses.

Table 4: Course description and learning activities for performance assessment

Course title	Course description	Sample activities for outcome assessment
History and Theory of Cultural Heritage Institutions	This course provides students with an overview of the history and theory of institutions whose mission is to collect, preserve, organize, interpret, and disseminate information about the cultural heritage, tangible and intangible, and by direct or virtual means. Students will gain a grasp of the purpose and mission of these institutions, from the "cabinet of curiosities" to the virtual collections that cross boundaries among libraries, museums, and archives, as well as cultural organizations that protect and interpret buildings and sites of cultural and historical significance or are dedicated to grass-roots efforts to promote the protection of heritage. The course will cover ethics, collection and curatorial practices, and the visitor/user experience, as well as the meaning of cultural heritage in the global environment.	Writing a review paper on the landscape of cultural heritage institutions in the DC area, including its historical formation, current environment, and future envisioning Writing a grant proposal of a program planning
Digital Curation	This course provides an overview of digital curation as a life-cycle management strategy to collect, organize, validate, preserve, share, support, and promote the use and re-use of digital cultural heritage assets; introduces digital curation infrastructures, standards, initiatives, models, and tools; and covers the concepts and skills involved in creating and managing an integrated and sustainable digital cultural heritage repository as a trusted body of digital information for current and future use.	Data management plan development Digital curation tool review Creation of a tutorial for tools Research on a digital curational scenario for an information setting
Metadata	Metadata plays a critical role in the creation, distribution, management, and use of physical and electronic resources/materials. This course covers the design and applications of metadata standards and discusses issues in metadata interoperability, vocabulary control, quality control, planning, and management. The course applies principles of information organization to organize digital resources for access, and compares selected metadata standards and examines how libraries, archives, government agencies, and museums apply metadata schemas and manage projects to make digital resources available to users.	Encoding exercises Metadata profile development

(Continued)

Course title	Course description	Sample activities for outcome assessment
Human Information Behavior	This course will engage students with information-seeking theories, and with research on human behavior relating to the use of libraries and information. The main focus of this course is on promoting an understanding of how different groups of people and communities seek, gather, retrieve, and use information in a variety of information environments. Topics of the course include frameworks for understanding behavior, seeking and retrieval of information, conceptual models of seeking and the search process, relationships between information seeking and information retrieval and organization, research approaches and methods, and the application of our knowledge of information behavior to the management of information services.	Applying information behavior models in describing and analyzing an information-related experience Writing a research plan paper of user study
Foundations of Digital Libraries	This course provides an overview of principles and practices in digital libraries. The course addresses theoretical, technological, social, and practical issues regarding building, organizing, and providing access to digital collections. Topics covered in the course include all phases of project management, including collection development, formatting standards and practices, metadata and markup standards, technical infrastructure, and end-user experience.	A case study Digitization guide development Digital collection prototype development with multiple parts of sub activities

A course learning outcome reveals direct measures of students' learning. In order to gather student perceptions about their learning experience, the program asked a group of 13 students taking these CHIM courses to respond to a short survey. Table 5 shows three questions on the survey and students' responses. Feedback from students shows very positive perception of their learning and the contribution of the courses to their professional growth.

In 2015, the author of this paper and her colleague organized and hosted a cultural heritage information management forum.[3] The forum was designed for cultural heritage practitioners, students, and researchers to share best practices and discuss urgent issues facing cultural heritage professionals. At the forum with 120 attendees, 15 current students made a poster presentation on research or a course project from the CHIM curriculum. Student presentations at the forum were a showcase for the forum's attendees and testament to student skills relevant to the LAMs practice. Thus the forum served to increase the visibility of the CUA-DLIS as an

Table 5: Responses to statements asking about student perception (*n* = 13)

Statement	Agree	Strongly agree
The courses increased my knowledge and understanding of the subject in CHIM fields.	23% (3)	77% (10)
The courses I took provided an understanding of the accepted professional practices in CHIM fields.	31% (4)	69% (9)
I am well prepared for my professional work.	1 ("Disagree") through 7 ("Strongly agree") 5 (38%, 5); 6 (31%, 4); 7 (31%, 4)	

educational program for LAM convergence. As a result, the department has been contacted by various cultural institutions, which have offered internships and job openings for current students and recent graduates. After graduation, by taking the CHIM course of study, many students found a job as a librarian or an archivist in respected cultural heritage institutions such as National Archives and Records Administration, the Library of Congress, Smithsonian Libraries and museums, the National Women's Art Museum, and the Metropolitan Museum of Art, as well as in academic libraries, archives, or public libraries.

Discussion and conclusion

The LAM sector has experienced changes in professional practices working collaboratively across boundaries by adopting emerging digital technologies to activate, engage, and transform their resources for the future and to provide access to them in new ways. This recent trend of practice demands that LIS educational programs provide the educational opportunities and guidance for students who want to pursue careers and succeed as information professionals in the converging work environment. In responding to such training demand, CUA-DLIS adopted a competency-based framework to reshape the curriculum to develop a concentration, CHIM, to ensure that students gain appropriate knowledge and skills to become professionals in the converging environment.

Statements of competencies and their outcomes were developed based on the literature review discussing the requirements involved in LAM work settings. They reflect what knowledge and skills students would acquire and demonstrate the effects of their learning to become a professional working in LAM settings. A set of competencies and outcomes served as an organizing tool for existing courses by determining what areas of the existing courses had sufficient coverage or what new courses needed to be supported. The competencies and outcomes served as a roadmap for course development and instructional design with relevant learning activities. By aligning such competencies and outcomes to instruction, faculty were able to demonstrate student skill acquisition.

The process of developing a competency-based curriculum resulted in a three-tiered structure of courses consisting of foundational core courses, a set of specialized courses for LAM, and electives for different career paths. Such a structure ensures that students develop a fine balance of foundational knowledge and skills in library professional practice, as well as ones in the converging environment of LAM, in order to take on new responsibilities and roles. This curricular structure became a guide for students to develop their career paths. It is also useful for communicating with stakeholders, employers, and prospective students about the curriculum and educational focus. This course of study has been popular among new applicants and has become one of our signature specializations.

The course of the curriculum development was generally successful. A key to such success was a thorough planning process, which took more than a year from the conception of an idea and buy-in support from faculty and stakeholders. The most challenging parts were related to implementation of the curriculum. As the curriculum was built based on existing courses, some courses needed to be tweaked to incorporate new aspects required in a certain competency or learning outcomes. In order to measure such learning outcomes, faculty needed to modify their assignments and develop additional rubrics. Some part-time lecturers were not familiar with learning outcomes assessment at all. Therefore, clear guidance, expectations, and support for instructors in revamping courses must be available in order to bring them on board during curriculum implementation. While the author of this article played a role in coordinating such collaboration and guidance, the process was quite challenging due to its time- and labor-intensive nature. Another challenge was scheduling. As the program was small, it was not feasible to have all courses of interest to students offered every semester; highly relevant courses were offered at least every year, while some other courses were rotated to be offered every other year, for example. Some students found it difficult to take a course that they wanted to take before graduation. Other than four core required courses, all courses were electives; students were free to make a selection among recommended courses. As a result, some students were unable to select courses balanced across all competency areas. In order to reduce such concerns over course selection, a study plan guide and checklist were developed to help students have a clear roadmap of their course progress along with the department's two-year course plan.

This three-tiered structure of the curriculum provides additional benefits. In fall 2015, DLIS launched a certificate in CHIM for practitioners interested in continuous learning in this area. Through the selection of the second-tier courses aligned in the competencies, the program was able to offer a certificate program as a continuing education program for working professionals to acquire and renew relevant skills for their career adjustment in the field of cultural heritage information management. It also allows the faculty to configure further potential sub-specialization with new areas.

When the program added new courses (Data Visualization, Data on the Web) in 2018, the faculty integrated these new courses into the digital archive field sub-specialization. Clearly, the tiered structure of the curriculum offers the program flexibility and coherence in implementing the new specialization. The department has a systematic curriculum review plan; the first tier of the foundational courses is reviewed and their outcomes are assessed each year. In addition to this review process, the faculty could focus on reviewing the second tier of courses for ongoing review of a specialization. Thus, the architecture of the curriculum makes it easy and efficient for faculty to monitor its administration and management within a small program.

The goal of the CHIM concentration was to produce information professionals who have competencies expected in the LAM work environment. As professional fields and practices are evolving with new issues emerging in the rapidly changing environment, competency statements and expected outcomes should be reviewed and updated to stay current and relevant in the near future. During the review process, various evaluation methods and an environment scan should be incorporated to discover gaps in student learning and determine which learning activities should be enhanced or modified to develop knowledge and skills.

In summary, reshaping the specialized curriculum based on a competency-based approach has contributed to the development of a cohesive specialized curriculum. The focus of the curriculum reform was on assuring that students acquire a range of knowledge and skills that can be beneficial to work in a LAM convergence. Learning activities of relevant courses were developed to be useful and relevant to requirements expected of information professionals in a LAM work environment. In other words, a specialized curriculum reflects the reality of practice and gives students the competencies to become professionals.

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Endnotes

1. See https://www.imls.gov/sites/default/files/publications/documents/chipsworkshopreport_0.pdf.
2. See http://www.ala.org/educationcareers/careers/corecomp/corecompetences
3. See https://lis.catholic.edu/news-events/chim-forum/index.html