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# Digital Skills Training for the Long-Term Conservation of Documentary Heritage in México

Ir a la versión en español

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Translation by Lucienne Marmasse

## ABSTRACT

The present ACADEMIC REPORT examines the integration of knowledge and the development of digital preservation competencies within academic programs in information science, including the conservation of documentary heritage. Certain document management activities in Mexico are explained to highlight the need to incorporate the teaching of computing methods and management for archives and information professionals. Furthermore, this report argues that one of the main components in the development of said competencies is the incorporation of a digital preservation laboratory and describes its relationship with education in the conservation of documentary heritage at the Escuela Nacional de Conservación, Restauración y Museografía (ENCRYM, Mexico).

## KEYWORDS

digital preservation, competencies, documentary heritage, records management

**T**he fact that institutions see a constant increase in the number of digital documents in their collections has transformed the tasks of professionals in this field: organizing, preserv-

ing and providing access to their content. This demonstrates the need to integrate computing skills within those related to collections management, creating a confluence of knowledge required to perform in a digital ecosystem. Framing the acquisition of skills in a teaching-learning focus that is based on competencies, such as the model used in the ENCRyM's Maestría en Conservación de Acervos Documentales (MCAD, Master's in Conservation of Documentary Heritage), requires their transversal integration in the digital environment, metadata management and electronic preservation.

This work argues that one of the main components of this integration is the use of digital preservation laboratories where students develop skills in document management software, dissemination of digital collections, digital preservation tools, and project management abilities. The first section explains certain fundamental activities of archives and collections management, identifying the core digital preservation competencies needed in the education of the conservation of documentary heritage. The second section presents an overview of the development of digital preservation competencies in library and archival education programs and the development of digital preservation laboratories. Finally, the third section describes both the integration of knowledge on digital preservation in the ENCRyM-MCAD, and the plans to strengthen that area of knowledge within the curriculum. This includes the development of a Digital Preservation Laboratory.

**COLLECTIONS MANAGEMENT**

Traditionally, the organization and conservation of documents have been carried out through registries created manually or in an electronic spreadsheet from a personal computer. In Mexico, the organization of records follows an information structure based on groupings, which facilitates the logical control of the totality of records in the institute's possession.

One of the principles of logical arrangement indicates that documents about a subject should be placed together in a unit called a *file*, which in turn forms part of a group of subjects or cases related to a procedure or administrative act, a group known as a *series*. Furthermore, another principle establishes that the *file* is the unit of information to be registered in the collection´s control instrument, for which the institution must assign a unique identifier, formed by a chain of letters and numbers that link the file and its position within the group of documents. From the point of view of document flow, we will say it begins with individual documents created during

the institution's daily work, in such a way that each must be read and understood by the person responsible for creating the collection, to ensure that they all meet the characteristics required to be integrated into the corresponding file.

Regulation indicates that files are stored in a physical space where, upon arrival, relevant preservation actions are applied to avoid deterioration and ensure inalterability. The records retention period varies and is regulated by a displacement mechanism that is part of the document flow, which is activated in accordance with the value of the file's contents. In other words, when they have lost their value for use in daily work, they are: transferred from the storage within the physical space where they are created to another space, whose function is to keep the files over another period of time or when their final disposition is determined, transferred for their permanent removal, being destroyed or sent for recycling, or kept indefinitely due to their historical value or social or institutional memory. The instrument to control the flow of documents is a list with a registry of the files that are transferred between storage areas.

With regard to access and use of the documents, searching is done through the archives' instrument of control, which contains the minimal indispensable description of its contents; retrieval, on the other hand, is done manually by the archives staff, then handed over to the person who requested the file, filling out a loan slip that must indicate how many pages it contains and the expected date of return to the collection's storage, which is also recorded, again manually, in the collection's instrument of control.

To summarize, the registration of files in the archive instruments of control, which enables the traceability of documents and their custody and conservation in one or more storage areas, along with the transfer of files, represent some of the central elements of records conservation from the institutional perspective. Although organizing, searching, and copying digital information improves when technology is incorporated in the document management process, the conservation of collections becomes harder, due to the fragility of their supports, which implies a greater risk of not being able to recover, reproduce, or interpret the digital information. Hence the importance of educating in computer skills and abilities, such as risk management, records management policies, cause-effect thought, object-oriented thought, understanding and application of basic computer algorithms, data modeling based on entity-relation diagrams, design and development of use cases, understanding and application of technologies to exchange data (such as XML and

JSON, among others), and their use in metadata management and long-term conservation of collections in digital storage sites and, above all, the design and application of policies and procedures for digital preservation.

## DIGITAL PRESERVATION COMPETENCIES IN ACADEMIC SETTINGS

Digital preservation first and foremost ensures the understanding, and subsequently, long-term access, use, and reuse of the document contents in electronic supports that are based both on established conservation policies,[1] curatorship[2], and information security[3], as well as on the use of computing tools applied to the strategies to implement said policies in the form of scalable processes from an item of information to large groups of items (Térmens, 2013, p. 16-18). In addition, a fundamental objective of digital preservation is maintaining the document's attributes on electronic supports identified by the standard UNE-ISO/TR 15489-1:2016, such as: the authenticity, reliability, integrity, and usability of its metadata (AENOR-CTN 50, 2016, point 5.2.2).

The integration of this knowledge requires a gradual process based on its transversal implementation within the curriculum. This allows students to gain knowledge in collections management and apply computational skills in their learning spaces.

With a focus on complementarity, several academic institutions have developed specializations, diplomas, and courses to foster skills in digital preservation practices and emerging areas of knowledge, such as digital curation and the application of computational methods in archival practices. In Mexico, in 2011, the then Centro Universitario de Investigaciones Bibliotecológicas (University Center of Library Studies*)*, currently the Instituto de Investigaciones Bibliotecológicas y de la Información (Library and Information Research Institute) in the Philosophy and Languages Faculty at the UNAM held the diploma course Administración y preservación de archivos digitales (Management and Conservation of Digital Ar-

[1] Conservation places emphasis on preventive and passive aspects of documentary safeguarding (Térmens, 2013, p. 16).
[2] Digital curatorship focussed on managing and promoting the use of data from the point of view of creation, so they are usable with a contemporary purpose (Sabharwal, 2015, p. 13).
[3] Information security establishes policies for the analysis, detection and possible solution of risks to information that data can suffer in a specific information system (Termens, 2016, p. 17-18). Equally, on the adequate application of organizational measures, such as establishing who is responsible for the data; environmental, to minimize risks and formative, so staff keep the codes secret.

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chives) (IIBI, 2011) and in 2015 offered the course Fundamentos para la preservación digital de colecciones sonoras (Fundamentals of Digital Preservation of Audio Collections). In 2022 the Facultad de Ciencias de la Información (FCI, Faculty of Information Sciences) at the Universidad Autónoma de San Luis Potosí (UASLP, Autonomous University of San Luis Potosi) offered the diploma course Archivos electrónicos en ambientes digitales (Electronic Records in Digital Environments) (De la Redacción, 2022) and the ENAH offered the diploma De la gestión documental a la preservación digital de los archivos universitarios (From Document Management to the Digital Preservation of University Archives) (ENAH, 2022). These examples demonstrate a recognition of the need to strengthen competencies related to digital preservation, both among students of the different branches of information science as well as professionals who work in the conservation of documentary heritage.

Meanwhile, professors at the Escuela Interamericana de Bibliotecología (EIB, Interamerican School of Library Science) at the Universidad de Antioquía, Colombia, have carried out research projects about education in archives and library sciences. Their research shows that the incorporation of knowledge about the impact of the digital context in archives and library sciences is an emergent theme. Castaño-Muñoz, Múnera-Torres and Uribe-Tirado (2018, p. 142) identified global and Latin American trends of teaching about Information and Communication Technologies (ICT) in library programs and how they compare to what was taught at EIB. They detected the predominance of a series of topics related to technologies, such as automatization, information architecture, and digital repositories (2018, p. 142). In that regard, Marín finds necessary, on the one hand, to incorporate a technological core to the curricula and, on the other, establish laboratories for the development of technological competencies applied to archives (2012, p. 301). This technological core, Marín argues, should be based on the recognition of the constant revision of theory and practice in a changing digital environment (Marín, 2012, p. 302). Similarly, Jaramillo, Betancur and Marín (2017) point out the need to articulate and consolidate curricula that addresses both the advances and developments in ICT and the archival realities in Latin America (p. 247). Therefore, and following on from what was argued by the EIB researchers, the development of competencies in digital preservation must go beyond learning to use certain software or tools: it must be based on a critical analysis of the theories and practices of digital preservation to examine the institutional and social implications according to their specific realities and contexts.

The curriculum at the ENCRyM's MCAD has evolved transversally, integrating both theoretical and practical knowledge about conservation in the digital environment. To strengthen this integration, a proposal was drafted in 2021 to create a Laboratorio de investigación y prácticas de preservación digital (Digital Preservation Laboratory). The following section covers this integration process.

## TEACHING ABOUT DIGITAL PRESERVATION AT MCAD

The Maestría en Conservación de Acervos Documentales (MCAD, Master in Conservation of Documentary Collections) was created in 2013 with the mission to "Educate professionals who will contribute to the field of conservation of documentary collections through research and by formulating proposals and strategies for interdisciplinary interventions, as well as their active integration into the different communities associated to collections"[4] (ENCRyM, n. d.). The study of conservation is approached in the broadest sense, considering various intervention strategies in all phases of collections management and their social implications. Since 2020 the digital preservation component began to be incorporated more integrally into the MCAD. This incorporation has the following objectives: to delve into the notion of *conservation of documentary collections in the digital context*; expose the MCAD students to this field of knowledge and develop competencies that allow them to put into practice methodologies related to digital preservation. Furthermore, the authors have accomplished the development of a line of research about conservation of documentary collections in the digital context, the integration of knowledge on digital preservation into the program's courses, and advice students with research and thesis projects that address digital preservation issues.

As part of the Sistema Institucional de Proyectos (SIP, Institutional System of Projects) of the Instituto Nacional de Antropología e Historia (INAH, National Institute of Anthropology and History), in 2021 the authors launched the initial plan for a Digital Preservation Laboratory, aimed at supporting research and education in conservation of documentary collections and addressing the challenges faced by institutions in the handling of digitalized and born-digital documents. The project has three objectives: firstly, to generate knowledge about digital preservation that adds to the study of conservation of documentary collections at MCAD; secondly, to create learning strategies where MCAD students develop competencies in

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[4] This quote is an editorial translation from the document in Spanish.

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digital preservation, and, thirdly, to collaborate with the other academic programs at ENCRyM and with other institutions that work on the conservation of documentary heritage.

Regarding the laboratories' first objective, the project's principal investigators have carried out collective and individual research. Collectively they have studied the topic of training in digital preservation; individually, one collaborates with a group of researchers from IIBI-UNAM on web archiving project about COVID-19 in México (Rodríguez Reséndiz and Blanco Rivera, 2023), while the other collaborates in the Área de Tecnología del Grupo de Preservación Digital de la Biblioteca Nacional de México (Technology Area of the Group for Digital Preservation at the National Library of Mexico), which has produced the guide *Criterios básicos para valorar sistemas de preservación digital* (Basic Criteria To Evaluate Digital Preservation Systems) (IIB-UNAM, 2020) and is currently developing the *Guía para la elaboración de planes de preservación digital en instituciones con memoria patrimonial* (Guidelines for the development of digital preservation plans in memory institutions).

Regarding the second objective, the integration of digital preservation knowledge into the Master's courses combines theoretical perspectives that problematize notions of *archive* and *document* in the digital context with the introduction to practices of handling digital objects. For example, the sessions of the module Materialidad y conservación de acervos (Materiality and Conservation of collections),[5] offered during the first semester, incorporate aspects such as analysis of the materiality of digital documents in the collection and their relation with metadata schemas, and the formation of information packages to be ingested into reliable digital repositories. Furthermore, basic concepts for the conversion of paper documents to digital images were introduced, linking them to the process of a digitalization project. The latter was seen in depth during the second semester, in the Seminario de Perspectivas y estrategias de investigación (Seminar on Research Perspectives and Strategies), where the students were able to delve into the way digitalization processes can be related to the archival workflow, and these processes leave traces that are fundamental to preserve the documents' authenticity and reliability. The course Gestión de los acervos (Collections Management) included object-oriented thought as well as risk management. During the third semester, the subject Teorías de los acervos documentales (Theories of Documentary Collections) introduces the concept of archives datafica-

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[5]  The Master's curriculum (2015) can be consulted on the ENCRyM website (2022).

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tion and the use of high-scale computational methods, along with the relation between metadata and access points.

Likewise, and regarding the third objective, there has been an improvement of collaboration with other areas at the ENCRYM, as well as other institutions: within ENCRYM, the principal investigators of the laboratory participate in the proposal for an ENCRYM Information Center, in collaboration with other MCAD professors, the ENCRYM Historical Archives and the school's Library and Documentation Center, and on the other hand, on the creation of a proposal for managing knowledge of cultural heritage.

Furthermore, the need to professionalize digital preservation implies the trend to strengthen and improve the practices in cultural institutions in Mexico. The workshop Introducción a Políticas de Preservación Digital (Introduction to Digital Preservation Policies) was held in January 2022, in the framework of Patrimonio en un Bit (Heritage in a Bit), a platform and event organized by the Museo de Arte Contemporáneo (Museum of Contemporary Art) of the UNAM (MUAC, 2021-2022), which the ENCRYM supported.

**CONCLUSIONS**

This work has presented an overview on the transversal incorporation of knowledge and competencies on computational processes to the education of professionals in documentary collections, so that the students can acquire the tools to face changes in the information society. It also highlights the importance of incorporating it from a multidisciplinary perspective, along with a critical vision regarding the complexities related to the preservation of digital objects in libraries, archives, and museums. The strategy described consists of the creation of research laboratories and the implementation of digital preservation practices that allow students to learn various software and computer tools and establish their relationship with collections management. In the specific case of the MCAD, it has incorporated knowledge of risk management and metadata, as well as computational processes, transversally in the curriculum, as part of the planning and implementation of a Digital Preservation Laboratory. This will integrate research, education, and collaboration to produce and disseminate knowledge related to the challenges faced by archives, libraries, and museums regarding medium and long-term preservation of digital documentary collections. The lab must be able to respond to technological changes in the digital preservation environment, maintaining a close relation between the integration of case studies and

technological changes, as well as offering workshops that address fundamental themes which will strengthen the master's program's teaching and learning processes.

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