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THE EDUCATION AND TRAINING OF ARCHIVISTS IN THE DIGITAL AGE: THE ITALIAN CONTEXT AND THE CASE STUDY OF THE 2nd LEVEL MASTER PROGRAMME IN "CREATION, MANAGEMENT AND PRESERVATION OF DIGITAL ARCHIVES"

ABSTRACT

Purpose: *This article aims at discussing the context of postgraduate education and training in the archival field, in Italy, highlighting new training needs that arose from the transformation of paper records in digital ones.*

Methods: *Starting from the Italian context concerning archival education and training, this article highlights how current teaching plans are still anchored to traditional content and are not able to provide the knowledge, skills and abilities necessary to deal with digital archives. This article then presents the case study of the 2nd level Master Programme in "Creation, management and preservation of digital archives in public and private sectors" at the University of Macerata, describing the characteristics and elements that have made it successful. Twelve editions have been organized so far and the thirteenth is currently underway.*

Results: *The levels of employment achieved by the Master's graduates and the levels of satisfaction revealed in the follow-up questionnaires show that there is a great demand for professionals with knowledge, skills and abilities provided by Master Programme like this. Furthermore, they show that it is necessary to work on renewing traditional teaching, providing more space to the topics related to the creation, management and preservation of digital archives to make them suitable for nowadays changing needs, while paying attention to not abandon traditional teachings that continue to be absolutely essential.*

Keywords: *archival science, education, training, digital archives, master.*

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L'ISTRUZIONE E LA FORMAZIONE DEGLI ARCHIVISTI NELL'ETÀ DIGITALE: IL CONTESTO ITALIANO E IL CASO DI STUDIO DEL SECONDO PROGRAMMA LIVELLO MASTER IN "CREAZIONE, GESTIONE E CONSERVAZIONE DEGLI ARCHIVI DIGITALI"

SINTESI

Scopo: *Questo articolo si propone di discutere il contesto dell'istruzione post-laurea e della formazione in campo archivistico, in Italia, evidenziando le nuove esigenze di formazione che sono nate dalla trasformazione dei documenti da cartacei in digitali.*

Metodi: *Partendo dal contesto italiano in materia di educazione e formazione archivistiche, questo articolo evidenzia come gli attuali piani di insegnamento siano ancora tradizionali, e non siano in grado di fornire le conoscenze, le competenze e le capacità necessarie per trattare gli archivi digitali. Questo articolo presenta poi il caso di studio del secondo programma livello master in "Creazione, gestione e conservazione degli archivi digitali nel settore pubblico e privato" presso l'Università di Macerata, descrivendo le caratteristiche e gli elementi che ne hanno decretato il successo. Finora sono state organizzate dodici edizioni, e la tredicesima è attualmente in corso.*

Risultati: *I livelli di occupazione raggiunti dai laureati del Master e i livelli di soddisfazione rivelati nei questionari di follow-up mostrano che c'è una grande domanda di professionisti con conoscenze, competenze e capacità fornite dal programma master in questo ambito. Inoltre, dimostrano che è necessario lavorare per rinnovare l'insegnamento tradizionale, fornendo più spazio ai temi legati alla creazione, alla gestione e alla conservazione degli archivi digitali per renderli adatti alle esigenze che oggi cambiano, prestando attenzione a non abbandonare gli insegnamenti tradizionali che continuano ad essere assolutamente essenziali.*

Parole chiave: *archivistica, istruzione, formazione, archivi digitali, master.*

IZOBRAŽEVANJE IN USPOSABLJANJE ARHIVOV V DIGITALNI DOBI: ITALIJANSKI OKVIR IN ŠTUDIJA PRIMERA MAGISTERSKEGA PROGRAMA 2. STOPNJE NA PODROČJU »USTVARJANJA, UPRAVLJANJA IN OHRANJANJA DIGITALNIH ARHIVOV«

IZVLEČEK

Namen: *Namen tega članka je razpravljati o kontekstu podiplomskega izobraževanja in usposabljanja na arhivskem področju v Italiji ter poudariti nove potrebe po usposabljanju, ki so nastale s preoblikovanjem papirnatih zapisov v digitalne.*

Metode: *Ta članek izhaja iz italijanskega konteksta arhivskega izobraževanja in usposabljanja, zato poudarja, kako so sedanji učni načrti še vedno povezani s tradicionalnimi vsebinami in ne morejo zagotoviti znanja, spretnosti in sposobnosti, potrebnih za obdelavo digitalnih arhivov. Ta članek nato predstavlja študijo primera magistrskega programa 2. stopnje na temo "Ustvarjanje, upravljanje in ohranjanje digitalnih arhivov v javnem in zasebnem sektorju" na Univerzi v Macerati, ki opisuje značilnosti in elemente, ki so mu omogočili uspeh. Magistrski program se trenutno odvija že trinajstič in je bil do sedaj izpeljan dvanajstkrat.*

Rezultati: *Stopnje zaposlenosti, ki so jih dosegli diplomanti magistrskega študija, in stopnje zadovoljstva, razkrite v nadaljnjih vprašalnikih, kažejo, da obstaja veliko povpraševanje po strokovnjakih z znanjem, veščinami in sposobnostmi, ki jih zagotavlja tak program. Poleg tega kažejo, da si je treba prizadevati za prenovo tradicionalnega poučevanja, tako da temam, povezanim z ustvarjanjem, upravljanjem in ohranjanjem digitalnih arhivov, zagotovimo več prostora, da postanejo primerni za današnje spreminjajoče se potrebe, hkrati pa smo pozorni na to, da ne opustimo tradicionalnih naukov, ki so še naprej bistvenega pomena.*

Ključne besede: *arhivistika, izobraževanje, usposabljanje, digitalni arhivi, magister.*

1 INTRODUCTION

For decades, archivists have been appraising, preserving, and providing access to digital records by using archival theories and methods developed with paper records in mind (Marciano, 2018), but the enormous development of information and communication technologies, together with the introduction of digital records both in the public and in the private sector, has changed the processes of creation, management and preservation of documents and archives. Public administrations and private companies today need to manage, on one hand, a highly unsustainable output of paper based on conventional procedures which are unsuitable in the current organizational, regulatory and technological context, and, on the other hand, need to embrace technological innovation in order to provide more efficient procedures to users who regularly use computers, smartphones, PDAs and other devices.

Hence the need for professional figures who have the skills to streamline document management processes, make the most of the potential offered by new IT technologies and ensure the creation and preservation of digital archives along with paper ones.

Furthermore, in the digital archiving and preservation field, a significant increase in the demand for highly qualified personnel is expected due to the provisions contained in the Italian Digital Administration Code[2] and in the Agency for Digital Italy[3] Guidelines[4], which enforce on public administrations, those who intend to entrust the service of preservation of their digital archives on third party companies, to make mandatory use of accredited Digital Curators who are requested, in addition to prove their economic reliability, technical capacity and IT security, to employ personnel with specific knowledge and experience in the field of document management, digital preservation and IT security.

2 RECORDS MANAGERS AND ARCHIVISTS NEED NEW SKILLS

As a consequence of this transition from the analogue to the digital document, a great demand has arisen for professionals capable of satisfying the needs of public administrations and companies in terms of digitization of documents, dematerialisation of workflows, creation and preservation of digital archives (Kallberg, 2012). In essence, the advent of the digital age has forced archivists, lawyers, administrators, computer scientists, organizers, communicators to review perspectives, methods and work tools in a strictly interdisciplinary perspective, to a much greater extent than in the past. In particular, the job market requires professionals with the knowledge, the skills and the abilities to perform the following functions:

- promoting good practice in creation, management, archiving and storage of documents, regardless of the medium on which they are recorded (analog or digital);
- evaluating the characteristics of integrity, accessibility, stability, legibility and authenticity of digital records;

2 Legislative Decree of 7 March 2005, no. 82, Code of digital administration. See <https://www.agid.gov.it/it/ agenzia/strategia-quadro-normativo/codice-amministrazione-digitale>.

3 The Agency for Digital Italy (in Italian: Agenzia per l'Italia Digitale, AgID) is a public body which has the task of guaranteeing the achievement of the objectives of the Italian digital agenda and contributing to the diffusion of information and communication technologies, promoting innovation and digital transformation of the country.

4 The "Guidelines on training, management and preservation of digital records" have not yet been published in their definitive form and are available as a draft at: <https://docs.italia.it/AgID/documenti-in-consultazione/lg-documenti-informatici-docs/it/bozza/index.html>.

- collaborating with the designers of the information systems so that procedures for the safeguarding of documents and document management are incorporated from the beginning;
- redesigning the administrative processes and procedures of private and public organizations, with the methods and tools of Business Process Management (BPM);
- implementing Workflow Management Systems (WfMS) for the automated management of work flows;
- designing and managing complex archival systems in the public and private sectors, ensuring the optimal use of information and communication technologies;
- guaranteeing the long-term preservation, description and use of digital archives and hybrid archives, i.e. composed of documents created on different types of media (paper, magnetic tape, hard disk, microfilm, etc.);
- producing general and specific finding aids for preserved archives.

3 DEMAND FOR NEW PROFESSIONALS IN THE FIELD OF RECORDS AND ARCHIVES IS INCREASING

To perform these functions, new professional are needed; Italian legislation specifically requires that the following three experts be present in all public administrations:

- the Head of document management, i.e. the professional required by article 61 of Presidential Decree no. 445 of 28 December 2000, containing the consolidated text of the legislative and regulatory provisions on administrative documents5, and in the Ministry Decree of 3 December 2013, containing the technical and application rules for the electronic protocol register;
- the Head of digital preservation, i.e. the professional required by the Ministry Decree of 3 December 2013, containing the technical rules on the preservation system, where his duties and responsibilities are specified;
- the Head of the archival preservation function, i.e. the professional defined by the Agency for Digital Italy in the Circular Decree no. 65 of 10 April 2014, containing the methods for accrediting public and private subjects who carry out digital records preservation activities (the so-called "Digital Curators")[6]. An attachment of the aforementioned Circular specifies the tasks and the requirements in terms of training and experience of such professionals;
- The Head of the digital transformation, i.e. the professional required by art. 17 of the Digital Administration Code and by Legislative decrees no. 179 of 26 August 2016, and no. 217 of 13 December 2017, which has the task of operationally guaranteeing the digital transformation of the Public Administration.

More generally, a wide and growing range of career choices is available to archivists and records managers professionals, such as the following ones:

- Records manager, i.e. the manager of records management activities in public and private organizations, including medium-large ones;

5 Based on article 61 of Presidential Decree of 28 december 2000, no. 445, the Italian public administrations have the obligation to assign the role of Head of document management to an executive or an official, and, in any case an employee with suitable professional requirements in technical-archival subjects acquired following specific training courses.

6 According to Italian law, Digital Curators are public or private bodies that offer the service of preservation of digital archives produced by other creators. Public administrations are obliged to apply exclusively to "accredited" digital curators,i.e. those Curators who have undergone a verification by the Agency for Digital Italy and have obtained recognition of possession of all the requisites of expected quality and safety.

- Digital Curator, i.e. the professional (or the organization) that must guarantee the long-term preservation of digital archives, directing the staff, composed of experts in the archival, IT and legal fields, with competence and skill.

As Anderson (2009) shows, traditional employers are national and local archives, but there are many more opportunities for people specializing in different areas related to this profession and serving organizations linked to the archive business. Professionals with the necessary expertise required to manage digital services are in growing demand both in public and in private companies.

4 THE EDUCATION OF RECORDS MANAGERS AND ARCHIVISTS IN ITALY

The long-term preservation and management of digital records is a major concern challenging archivists. Preserving digital records involves various challenges, including policy matters, institutional roles and relationships, legal issues, intellectual property rights, metadata and other technical topics. The education of records professionals requires an update educational framework that draws upon diverse sources of knowledge (Lemieux, 2019).

So, archivists need new skills that are generally not provided by traditional educational programs of university courses and other training agencies.

For instance, in Italy the archivists' education and training has traditionally been entrusted to Universities on the one hand, and to the School of Archival science, Paleography and Diplomatics on the other hand. The latter are public schools, placed in seventeen State Archives Bureaus [7] and offering free para-university level training lasting two years[8]. Still based on the State Archives Regulations approved with the Royal Decree no. 1163 of 2 October 1911, the teaching plans of the Schools has undergone numerous adaptations over the years. Unfortunately, the attempts made to date to set the Schools on new criteria have produced no other result than to fuel a debate on the relationship between the archivist and his work, between the archives and society, between archival training and university courses. This kind of education is generally considered not sufficient to provide the skills required for the management of digital archives, nor are there other training agencies capable of providing adequate preparation. There are, however, some exceptions that should be remembered.

For example, at the Central State Archive[9] in Rome, a course of advanced training in contemporary archiving has been active for some years. It provides 150 hours of face-to-face teaching activities, divided into lectures, conferences and seminars, taught by professors of different universities and managers of various administrations. The studied topics concern general archiving, documentary information technology, computer document management and digital preservation and subjects related to the organization and functioning of the central and peripheral bodies of the state, the procedures for declassifying archival documentation and the right to confidentiality and privacy.

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7 In Italy, State Archives are preservation bodies whose competences consist in supervising and preserving the archival and documentary heritage produced by peripheral state public administrations, and in making them freely accessible to the public. They are 103 and, as a general rule, they are located in the provincial capitals and in cities of particular historical importance (they are called "detached sections" of the State Archives).

8 The teaching plans of the Schools of Archival science, Paleography and Diplomatics are regulated by articles 58-64 of the Royal Decree no. 1163 of 2 October 1911, and by article 14 of the Decree of the President of the Republic no. 1409 of 30 September 1963 (known as "Archival Law of 1963"). These programs are now largely obsolete.

9 The Central State Archive is an institution of the Ministry for cultural heritage and mainly preserves the documents of the central judicial and administrative bodies of the Italian State. It is based in the city of Rome.

Another positive mention goes to the Italian National Archival Association (ANAI) which for some years has undertaken an intense teaching activity on issues relevant to digital archives by carrying out numerous professional training and updating initiatives, such as study sessions, seminars and training courses.

Then there are some Italian universities that have well understood the need and urgency to train the new professionals now in demand due to the transition from analogue to digital archives, and have started to provide specific post-graduate training courses. In particular, in the 2019/20 academic year there are three 2nd level Master Programmes[10] that offer at least some specific teachings on the topic of digital archives:

1. the Master Programme in "Preserving and Ensuring an open goveRnment for a Smart access to sciEntific and cultural sOurces (PERSEO)" at the University of Calabria[11];
2. the Master Programme in "Archiving, Librarianship and Codicology. Rearrangement and inventory of archives and cataloguing of handwritten, printed and digital documents" at the University of Florence[12];
3. the Master Programme in "Creation, management and preservation of digital archives in the public and private sector" at the University of Macerata.

In the following we will focus on the latest training proposal that represents a best practice to be inspired by.

5 THE 2ND LEVEL MASTER PROGRAMME IN "CREATION, MANAGEMENT AND PRESERVATION OF DIGITAL ARCHIVES IN PUBLIC AND PRIVATE SECTORS" AT THE UNIVERSITY OF MACERATA (ITALY)

The 2nd level Master Programme in "Creation, management and preservation of digital archives in public and private sectors" at the University of Macerata (Italy)[13] is directed by Stefano Pigliapoco, full professor of Archival Science at the University of Macerata[14]. It aims at providing students with skills not yet provided by traditional and consolidated courses (Bonfiglio Dosio, 2015) and addresses mainly, but not exclusively, the issues of creation, management, and preservation of digital archives, as the name says. But alongside those topics, predominant in the current administrative scenario, the master's teaching plan deals with two other very interesting areas of application for the digital archives sector: the digitization of documents produced on traditional media (mainly paper and parchment, but not only) and the description of documents and archives in archival information systems.

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10 The aim of a Master Programme is to develop and strengthen the postgraduates' advanced knowledge, skill and expertise in specific field, provide them with further professional education and training to meet the demands of the professional world. To access the Italian 2nd level Master Programme, a 2nd Cycle Degree (Master's degree) or equivalent is required. It corresponds to the 8th level of the European Qualifications Framework. See <https://www.cedefop.europa.eu/en/events-and-projects/projects/european-qualifications-framework-eqf>.

11 See <http://www.labdoc.it/formazione/progetti-e-corsi/perseo>.

12 See <https://www.masterarchivisticabiblioteconomiacodicologia.unifi.it>.

13 See <https://www.masterarchividigitali.unimc.it>. In Italian the title of the Master is: "Formazione, Gestione e Conservazione di Archivi Digitali in ambito pubblico e privato (FGCAD)". At the moment the lessons are held in Italian, but plans are being made to gradually start supplying specific training modules in English.

14 Together with him, the Board of directors includes Giorgetta Bonfiglio Dosio, former Professor of Archival Science, Giulio Salerno, full professor of Public Law, Federico Valacchi, full professor of Archival Science, and Simone Calzolaio, associate professor of Constitutional Law.

This Professional Master Programme has reached its thirteenth edition in the 2019/20 academic year and currently has 65 students enrolled. The education is provided in a blended mode, that is, through both online and face-to-face lessons. To facilitate the attendance of lessons, the Master is delivered in three locations in Italy: in addition to Macerata, in the center of Italy, where the University of Macerata is based, students can follow the face-to-face lessons also in Milan and in Padua (in the north of Italy). To further facilitate attendance, face-to-face lessons are concentrated in a single monthly meeting of 12 hours each (approximately a Friday and a Saturday per month).

The teaching plan of the master is clearly based on multi-disciplinarity, in the belief that the creation, the management and long-term preservation of digital records and digital archives, requires knowledge and skills in different domains (Pigliapoco, 2015):

- in the archival field, to define organizational and procedural models that ensure the correct creation of the archive, prepare classification schemes and preservation plans, develop management and preservation manuals, carry out the selection or archive rejection operations in a digital environment, ensure the description of the digital archives and the provision of access and use services;
- in the IT field, to evaluate the technological aspects related to electronic signatures, guarantee the IT security and operational continuity of the systems, prevent the risks of technological obsolescence, verify the compliance of hardware and software equipment with the technical rules established at national level and internationally, to redesign processes and manage systems;
- in the legal field, to guarantee the production of digital records with legal validity and compliance with current legislation on the protection of personal data;

1.1 The teaching plan

For the 2019/20 academic year, the Master Programme includes 1,500 hours of total workload for the students which are divided as follows:

- 300 hours of teaching activity, divided into 84 hours of face-to-face lessons and 216 hours of on-line lessons accessible through the e-learning platform of the University of Macerata and corresponding to 50 university training credits (ECTS credits)[15];
- 300 hours of internship or project work
- 900 hours of individual study and workload for the final exam.

The internship or project work activity generally takes place in the period between July and November; this year, due to the Covid-19 pandemic, students will have additional time to complete it. Attendance is compulsory and cannot be less than 75% of the total hours provided for each module: in particular, attendance cannot be less 75% of the total hours of face-to-face lessons. The resulting overall teaching plan is shown in Table 1.

15 The European Credit Transfer and Accumulation System (ECTS) is a standard means for comparing academic credits for higher education across the European Union and other collaborating European countries. ECTS credits are used to facilitate transfer and progression throughout the Union. A single ECTS credit is equal to 25 hours of student workload, so taht one academic year corresponds to 60 ECTS credits that are normally equivalent to 1500 hours of total workload. ECTS also includes a standard grading scale, intended to be shown in addition to local (i.e. national) standard grades.

Table 1. Teaching plan of the Master Programme, 13th edition, a.y. 2019-20

Module name	ECTS credits	Hours
Module 1: basic knowledge of archival science	4	24
Module 2: documentary informatics	11	66
Module 3: legal aspects related to the creation, transmission, management and preservation of digital records	8	48
Module 4: electronic records management and digital archiving	16	96
Module 5: digital preservation	11	66
Internship/Project work	6	300
Individual study		900
Final exams	4	
TOTAL	60	1500

As shown in the teaching plan, in addition to the traditional archival teachings, this Master Programme provides a whole series of teachings that normally do not find a place in the teaching plans of the first and second cycle university degrees, but on which the concrete possibility of preserving long-term digital archives depends. All topics are addressed with reference both to the Italian legislation on digitization and dematerialization in the public and private sectors, and to the standards and reference projects at European and international level. This allows graduates to seize job opportunities nationally and internationally, by proposing to serve in entities and companies operating in other countries. To facilitate the inclusion of participants in the job market and complete the course of study with the exposition of practical cases and advanced technological solutions, synergies have been activated with various companies operating in the Electronic Document Management sector. In the following we will briefly analyze the contents of each of the 5 modules.

1.2 Module 1: Basic knowledge of archival science

Since students come from different training curricula (some are archivists but others are computer scientists, other lawyers, other accountants, etc.) the first module of the teaching plan provides them with the basic knowledge of records management, a necessary step to enable them to follow with profit the lessons of the following modules that deepen the specific issues of the management, archiving and preservation of digital records. The aim is to level the differences resulting from the different studies carried out by the students, in relation to the fundamental principles of archival science, and the methods and tools for the creation of archives. Table 2 summarizes the teachings provided in Module 1.

Table 2. Teachings of Module 1: Basic knowledge of archival science

Teaching	ECTS-credits	Hours
Records management: methods and tools	4	24
Total module 1	4	24

1.3 Module 2: Documentary informatics

The second module of the teaching plan is entirely dedicated to training in documentary informatics and in particular to the study of the technological tools that most apply to the production of digital records, their security and accessibility.

With the first teaching, students are provided general knowledge of computer security with an extensive examination of the possible risks and related countermeasures. The requirements imposed by the Italian legislator for the safety of the digital preservation system are geared towards ensuring maximum protection measures that concern not only the logistical and technological aspects, but also the organizational and procedural ones. This kind of knowledge is fundamental for the Head of document management and the Head of preservation to develop, in collaboration with the Head of the information system and the Head of personal data processing, effective plans for the security of the document management system and the preservation system.

The second teaching focuses on the problem of file formats obsolescence. It is necessary to choose those suitable for the production of digital records, both as digital native entities and as objects obtained from the digitization of analogic originals. The study of the characteristics of file formats, of their weaknesses in relation to technological obsolescence, in addition to being preparatory to the development of effective solutions for digital preservation, provides useful indications on how to best exploit the potential of computer systems. A good part of the second course is devoted to techniques for digitizing analog documents, not only paper documents but also photographs, sound recordings and audiovisual recordings, whose importance is increasing nowadays.

The third teaching is dedicated to XML (eXtensible Markup Language) that can be used to create self-descriptive, human and machine-readable documents in order to completely automate workflows and therefore minimize the work time. Many examples and case studies are discussed with the students.

Finally, with the last teaching, students are taught the knowledge of archival description - with a particular focus on ISAD (G), ISAAR (CPF), ISDIAH, ISDF and the new standards Record in Context (RiC) - and on archival information systems. Table 3 summarizes the teachings provided under Module 2.

Table 3. Teachings of Module 2: Documentary Informatics

Teaching	ECTS-credits	Hours
Computer security, databases and three-year plan for information technology in public administration	3	18
Digitization of analog documents and file formats	3	18
XML language: theoretical and practical aspects	3	18
Archival description software and archival information systems	2	12
Total module 2	11	66

1.4 Module 3: Legal aspects related to the production, transmission, management and preservation of digital records

Module 3 provides understanding of legal issues correlated to the production of electronic and analogic documents, as well as to the evaluation of the probative efficacy of electronic signatures affixed or associated to them and to the protection of personal data. Those topics are discussed not only with reference to the Italian legislation, but also to the European one.

The second teaching deals with the relationships between Italian Digital Administration Code and the eIDAS Regulation[16], which requires the establishment in each Member State of the European Union of an electronic identification regime managed by authorized entities and the notification to the European Commission of the systems activated to allow cross-border authentication of the online services of public sector bodies.

Finally, the third teaching deals with the GDPR and its effects on the management and accessibility of archives. Table 4 summarizes the teachings provided under Module 3.

Table 4. Teachings of Module 3: Legal aspects related to the production, transmission, management and preservation of digital records

Teaching	ECTS-credits	Hours
Methods and tools for the production and transmission of digital records	4	24
EU Regulation n. 910/2014 (eIDAS) and Italian Digital Administration Code	2	12
Accessibility, transparency and privacy: implementation of the GDPR for the protection of personal data	2	12
Total module 3	8	48

1.5 Module 4: Information Document management and digital archiving

The fourth module of the Master Programme's teaching plan is entirely dedicated to issues relating to the production, management and preservation of digital records, including methods for the design of workflows.

In particular, the first teaching analyzes the technological and legal tools necessary for the subscription and transmission of digital records. Students will become familiar with topics such as electronic signature, of which the Digital Administration Code defines and administers four different versions, each carrying at different legal value[17], in the awareness that digital preservation processes must be customized according to the tools used and the processes performed to guarantee the authenticity and integrity of electronics documents. A part of the course is dedicated to the study of the certified e-mail service (in Italian: Posta Elettronica Certificata, PEC), which is the system designed and built in Italy for the transmission of digital records with guaranteed delivery, integrity and confidentiality of messages. All these topics are developed by referring not only to the legislation in force in Italy but also in other European countries, in order to train professional specialists who are prepared and employable beyond the borders of Italy, in the wider international job market.

The study of Electronic Records Management System (ERMS) represents one of the fundamental topics of this teaching. From a technological point of view, the requirements are specified for: guaranteeing the security and integrity of the managed digital documentary heritage; ensure the tracing of the operations carried out on the document system and the identification of the authors; protect documents from

16 Regulation (EU) No 910/2014 of the European Parliament and of the Council of 23 July 2014 on electronic identification and trust services for electronic transactions in the internal market and repealing Directive 1999/93/EC.

17 The Digital Administration Code outlines four types of signature for digital records: electronic signature, advanced electronic signature, qualified electronic signature and digital signature. Of the latter, two variants are allowed: the digital signature generated with the device issued to the holder and the remote digital signature that provides for the installation of the qualified electronic certificate of the signatory in an HSM (Hardware Security Module) system activated at an accredited certifier.

unauthorized access and therefore implement an effective policy to protect their confidentiality; develop advanced interoperability and application cooperation solutions between all components of the creator's information system[18].

Moreover in this case, all the topics described above are treated with reference both to the legislation in force in Italy concerning the electronic protocol register[19], and to the projects and reference standards at international level, like, for example, the MoReq (Modular Requirements for Records Systems) specifications[20], and the standard ISO 15489-1:2016 (International Organization for Standardization (ISO), 2016)[21] for the implementation of ERMS systems in public or private organizations is proposed in order to standardize the best international operating methods for the document management.

The second teaching is dedicated to the study of metadata for records management, both to facilitate its identification and recovery (descriptive metadata), and to create a structured, well-defined information base to support management and conservation activities[22]. It is also dedicated to a full archival description of the documentary heritage of cultural-historical interest (archival descriptive standards). The main metadata schemes analyzed are: ISAD (G), ISAAR (CPF), EAD, EAC, DublinCore and METS. For each of them, the purposes, the differentiations and the similarities with the other schemes, the prospects for evolution and the application profile are specified; the goal is to provide students with the knowledge to identify and apply the most suitable metadata standard according to the type of objects to be treated and the objectives to be achieved.

Since most of the current administrative procedures have been designed in the past years, when documentary production was exclusively on paper, and therefore they are characterized by outdated forms of communication, organizational models and procedural schemes, the third lesson focuses on the analysis and redesign of the processes in order to create an environment predisposed to the digitalization of documents, to their communication and archiving in digital format, without which the introduction of innovative tools for the production of digital records does not lead to efficiency, but on the contrary causes administrative time delays and generate increased disorder in document management. Table 5 summarizes the teachings provided under Module 4.

18 The latter requirement is particularly relevant as computer documents tend to remain stored in the systems used to produce them, receive them or transmit them electronically, while to ensure the formation of the digital archive they should converge, possibly automatically, with the mechanisms interoperability and application cooperation, in a unitary system accessible via the network.

19 At present, the Italian legislation on the electronic protocol register is defined in Presidential Decree no. 445 of 28 December 2000, containing the consolidated text of the legislative and regulatory provisions on administrative documentation, and in the Prime Ministerial Decree of 3 December 2013, containing the technical rules.

20 See <https://www.moreq.info/>.

21 ISO 15489-1:2016 defines the concepts and principles from which approaches to the creation, capture and management of records are developed.

22 This includes the administrative, management and preservation metadata together with the structural metadata that connect the various components of the resources to each other.

Table 5. Teachings of Module 4: Information Document management and digital archiving

Teaching	ECTS-credits	Hours
Records management and implementation of Electronic Records Management Systems: theoretical issues and application solutions	10	60
Metadata for records management: reference standards and application logics	2	12
Methods and tools for the description, re-engineering and automated management of administrative processes / procedures (Workflow Management System)	4	24
Total module 4	16	96

1.6 Module 5: Digital Preservation

The teachings of the fifth module of the Master Programme are focused on the theme of long-term digital preservation and didactic continuity, in connections with the subjects covered in the previous modules. In this module students begin to study digital preservation systems being already aware of the connected risks of technological obsolescence, the requirement to maintain the evidentiary strength of electronic signatures and the minimum set of metadata to be enhanced in order to outline the interdependence relationships that exist between the documents of a digital archive.

The first teaching focuses on the preservation process based on the OAIS model (Reference Model for an Open Archival Information System), which was developed by the CCSDS (Consultative Committee for Space Data System) and subsequently approved as an ISO 14721:2012 standard (International Organization for Standardization (ISO), 2012a). This is the conceptual model adopted in the main digital preservation projects carried out internationally and indicated by the Agency for Digital Italy as a mandatory requirement for the accreditation of conservators[23]. The study plan provides first of all the analysis of the peculiarities of the OAIS, which consist in being an open solution, independent of the technologies, applicable to any information object - digital or analog - based on the use of a predefined data structure, called the "information package", for the acquisition, preservation and consultation of digital documentary and archival units. During this course, the ISO 16363:2012 (International Organization for Standardization (ISO), 2012b) and ISO 16919:2014 (International Organization for Standardization (ISO), 2014)[24] standards dedicated to the auditing activities of digital preservation deposits are illustrated.

The second teaching is dedicated to preservation metadata, such as PREMIS and the Italian standard UNI SinCRO (Italian National Unification Body (UNI), 2020) which defines the structure of the data set to support the process of preservation and recovery of digital objects by means of the formal XML language.

To complete the fifth teaching module, the third course illustrates the technical rules in force in Italy regarding the preservation system, the accreditation methods of digital curators by the Agency for Digital Italy and the most significant achievements at national level. Ample space is dedicated to the analysis of the professional profiles specified by the Agency for Digital Italy for the staff that Digital Curators must have in order to obtain accreditation, underlining the full compliance of the teaching plan of the Master Programme with the qualification requirements established by the Italian legislator. Table 6 summarizes the teachings provided in Module 5.

23 Cfr. le regole tecniche in materia di sistema di conservazione emanate con il DPCM 3 dicembre 2013.

24 ISO 16919:2014 is meant primarily for those setting up and managing the organization performing the auditing and certification of digital repositories.

Table 6. Teachings of Modulo 5: Digital preservation

Teaching	ECTS-credits	Hours
Preserving digital material: purposes, critical issues, methods and conceptual model OAIS standard ISO 14721	3	18
Preservation metadata and UNI SinCRO standard	3	18
Digital preservation in Italy: regulations, accreditation of curators and surveillance activities, phases of the digital preservation process, professionals, preservation manual and case studies	5	30
Total module 5	11	66

It is worth noting that the analysis of the teaching plan shows that these teachings normally find no place in the teaching plans of most Italian university degrees in Archival Science.

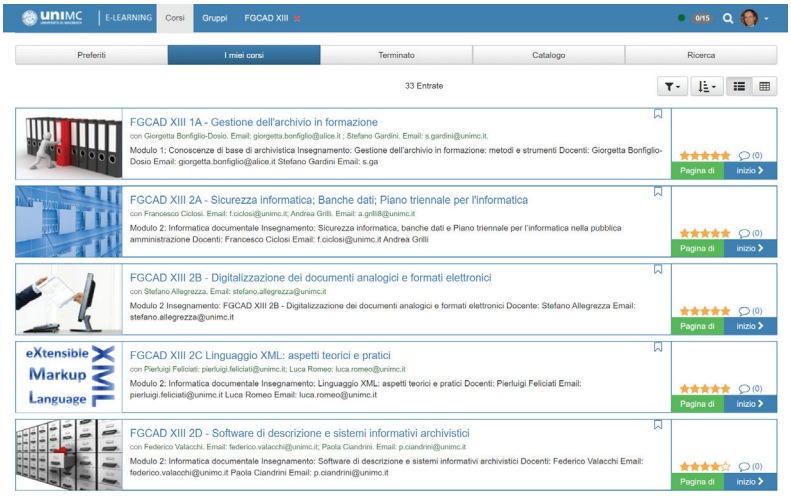
1.7 Internship and project work

The complexity of the topics covered, the highly innovative nature of the tools analyzed and the many elements that differentiate the preservation of paper archives from the preservation of the digital ones, make it necessary to complete the program with a work experience in organizations where their newly learned expertise is relevant, while confronting with real problems and putting into practice, at least partially, the knowledge they acquired. So, students are required to carry out a 300-hour internship at public bodies or private companies (eventually replaced by the students already employed with a project work to develop in their workplace on a theme previously agreed with the Board of directors) which represents a formative moment of fundamental importance.

1.8 The success of distance learning

One of the strengths of this Professional Master Programme - and certainly one of the factors that contributes to its success – is distance learning, which is provided through the e-learning platform of the University of Macerata (see Figure 1)[25] A personal account is activated for each student. Obviously, students must have an active Internet connection on their PC.

Figure 1. Screenshot of the e-learning platform initial page



25 The e-learning platform adopted by the University of Macerata is OLAT (Online Learning And Training), an open source and web-based Learning Management System. It has been customized to adapt to its needs and make it usable in all distance courses.

The teachings consist of one or more videotaped lessons, presented with synchronized slides and integrated with the materials provided by the teacher (which can be multimedia objects of any kind: texts, drawings, presentations, bibliographies, links to websites, audio and video files) and a series of additional tools, such as an online bulletin board for reports and notices; a discussion forum run by the teacher; wikis, blogs, podcasts.

Through this platform, students can follow online lessons, download teaching materials and access network resources, carry out self-assessment tests, intermediate and final verification tests prepared by teachers, etc. The material is available 24 hours a day, 7 days a week and this is particularly appreciated by students, who enjoy the freedom of choosing the time to connect to the platform and carry out their activities. In addition to video lessons and other resources that can be used asynchronously, the e-learning platform also provides collaborative tools in synchronous mode, such as chat and video conferencing.

The online teaching tools were particularly useful during the 2019/20 edition of the Master Programme because the evolution of the COVID-19 pandemic forced the Master's Board of directors to convert almost all face-to-face lessons to online lessons.

Each teaching requires a final verification test, which is also carried out via the e-learning platform. There are two types of tests: close-ended and open-ended; the latter typically consists in the development of a report on a subject selected by the teachers. While the close-ended test allows to evaluate the students' level of preparation on the teaching topics, the open-ended test provides indications on his ability to apply the theoretical knowledge acquired in typical working scenarios.

At the end of the course, students must take a final exam. It consists in the discussion of a short paper in front of a specially appointed Commission. The dissertation can deal with the same topics developed in the project work, or the issues addressed in the internship experience, but must have a scientific-cultural character and present an adequate level of depth with personal prospective assessments by the student.

6 APPROACHING THE JOB MARKET

Some of the Master Programme's students already have a job, but those who are unemployed easily find a job in both public and private sectors after graduating. In fact, public administrations are called to implement a set of rules that guide them in digital transition paths, towards the digitization of documents and the dematerialization of administrative procedures, providing for new professional specialists, such as those trained by this Master Programme.

Similarly, businesses and other private entities have a strong interest in cutting down the costs of paper documentary production and taking advantage of the opportunities offered, among other things, by the new rules on electronic invoicing and digital archiving of tax documents.

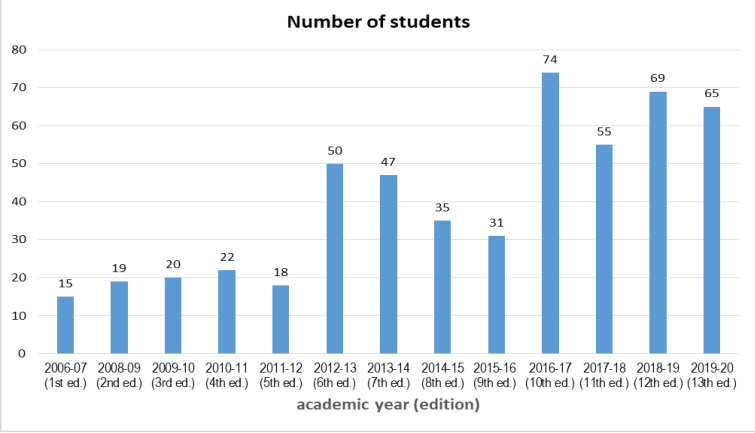
Finally, Accredited Digital Curators[26] have the obligation to have professional profiles such as those trained by the Master Programme; as a result, graduates easily get a job in these organizations.

26 The "Accredited Digital Curators" are "Digital Curators" that have undergone a verification process by the Agency for Digital Italy, and have achieved the recognition of the highest level requirements (accreditation).

7 CONCLUSIONS

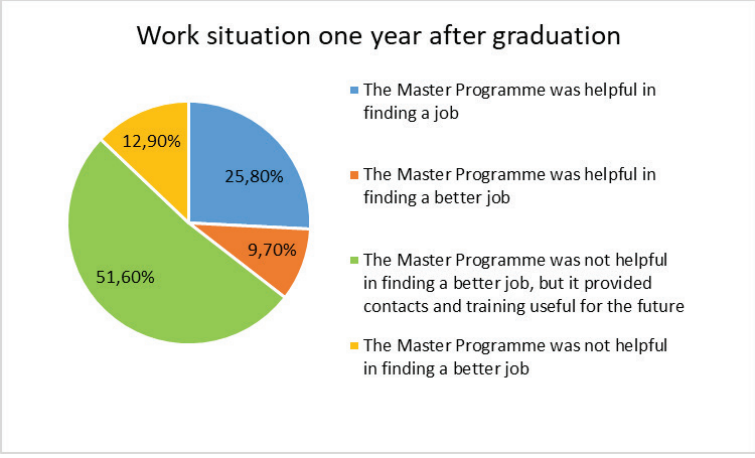
Some useful considerations can be drawn from the analysis of the Master Programme just carried out. First, the number of students enrolled has gradually increased to exceed the most optimistic forecasts. Figure 2 shows the progress of the number of students from the first edition to the current one. In recent years, the number of enrolled students has regularly been between 60 and 70, an extraordinary result considering that the average number of enrolled students in an Italian Master Programme is around 20.

Figure 2. Number of students enrolled per academic year



Secondly, the follow-up surveys that are regularly conducted show that the students consider the Master Programme useful for looking for a job or for improving their job position. One year after graduation, 25.8% of the students consider the Master Programme helpful in finding a job; 9.7% declare that the Master has been helpful to improve their employment status or change job; 51.6% think that the Master did not change their employment status, but it provided contacts and professional training needed in the future; only 12.9% does not consider it helpful to improve their working position (see Figure 3). Overall, 93% of the students found the master useful for looking for a job or improving their job position.

Figure 3. Work situation one year after graduation



The high levels of employment achieved by the Master's graduates show, on the one hand, that there is a strong demand for professionals with the knowledge, skills and competences such as those provided by the Master Programme and, on the other hand, that it is necessary to renew traditional teaching, giving more space to the teachings related to the creation, management and preservation of digital archives to make them suitable for new and changing demands, without neglecting traditional training which continues to be absolutely irreplaceable and provide the basis for understanding the new teachings.

Furthermore, since issues related to digital archives are highly dynamic and affected by rapid and frequent changes (due both to the evolution of the regulatory framework and the availability of increasingly advanced technological tools) any education and training action must be kept constantly updated and periodically renewed. The teaching plan of the Master Programme at the University of Macerata perfectly meets these requirements and is renewed and updated year after year. All these elements testify that it fully addresses the training needs of archivists in the digital age and represents a best practice to be seriously considered as a reference when planning new training courses and also when revisiting the traditional teaching plans of the university degree courses.

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