The Diplomatic and Digital Forensic Science in Born-Digital Records: The Quest for Authenticity

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ABSTRACT

This paper aims to applicate of Digital Diplomatic and Digital Forensics Science in digital-born records, not only to guarantee its authenticity in institutional routines and processes, but also to use as a source of proof in possible legal and juridical scenarios. Inside the discussion about the complexity of the digital records in Archival Science and Information Science (I.S.), have a gap to manage and preserve the digital records, which try to keep them reliable, accurate and authentic in systems that have the same conditions. This gap makes it impossible to preserve records in the long term due, firstly, to the fragility of the systems where they are stored and, secondly, to the constant risks of obsolescence of hardware and software that occur on a day by day. Digital Diplomatic Science assists this process by determining the form and content of the record to evidence its legal-diplomatic authenticity and establish its historical value. Digital Forensic Science, in turn, provides support for the chain of custody to remain intact, regardless of the medium on which the digital record is fixed. It raises the following questions: Is it possible to apply the practice of law and the Digital Forensics in the area of the Archival Science and Information Science, guaranteeing the authenticity of the born-digital record? Which way does the junction between Digital Diplomatic Science and Digital Forensic Science guarantee the conservation and preservation of the born-digital records? To answer such questions, this research proposes to link five areas of knowledge following the scientific experiences conducted at the University of British Columbia in Canada by the InterPares (International Research on Permanent Authentic Records) group. Areas of knowledge that are offering interesting results to preserve not only the record, but also the social memory: 1. Digital Forensics: discipline that joint Forensics Science with Computer Science to analyze the digital evidence. 2. Diplomatics Science: Science to analyze the form and structure of the records. 3. Archival Science: This science involves the whole of the principles, policies, strategies and activities designed to ensure the physical and technological stabilization of records for the purpose of extending indefinitely their life and protecting the accuracy and authenticity of and maintaining the accessibility to their intellectual content. Thus, preservation includes, among many other activities, description, which provides an account of the context, attributes, and relationships of the documents, and the development and maintenance of retrieval systems [1]. 4. Information Science: Science to analyze the information in different contexts. This paper will carried out in a theoretical and qualitative way, taking into account the literature shared in the site Digital Records Forensics Project, coordinated by the author Luciana Duranti of the InterPares group, and the bibliography produced in the areas of knowledge already referenced. The results obtained will contribute to the realization of alternative researches in document conservation within the Archival Science and the Information Science.

Keywords: Digital Diplomatics; Digital Forensics; Born-Digital Record

Abbreviations: I.S. Information Science

1. Introduction

This paper will highlight and broaden the discussion about the contribution of Digital Diplomatic Science, a contemporary methodology of a secular science that analyses the nature, genesis, formal characteristics, structure, transmission and legal consequences of records to prove their authenticity [2]. The contribution provided by Digital Forensic Science, is defined as,

> [...] the application of Computer Science and investigative procedures for legal purposes, linking the analysis of digital evidence, chain of custody, mathematical validation, the appropriate use of tools,

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reproducibility and possible reports presented by an expert [...][3]

In some studies, the term digital record used to be synonyms of electronic record, but they have differences. Digital record is a document encoded with binary digits, in values of zero and one, and, this research works with it. Electronic record is "[...] any analog or digital document carried by an electrical conductor which requires the use of an electronic equipment to be understood by a person (e.g. the fax) ... "[4]. To clarify the sentence, the author Rondinelli [5] explains that:

According to the *Cámara Técnica de Documentos Eletrônicos* (2010), electronic record is a document coded in "analogue form or in binary digits, accessible through electronic equipment." In other words, it can be said that every digital record is electronic, but not every electronic record is digital. The cassette, for example, which sound needs an electronic equipment to be heard, is not codified in bits.

The Archival and Diplomatic Sciences, when joint, starts to analyze the record beyond their fixed documentary form (presentation in the same way it was when they were first stored) and stable content (mandatory and unchanged permanence of information). Even in the analogue context, they used to links records ("organicity"), to recognize identifiable context (legal-administrative, provenancial, and procedural) [6], and consider people involved in its creation and participation in its cycle [7]. In the digital environment, these studies developed from Archival and Diplomatic Sciences received more focus.

One of the objectives of Digital Diplomatic Science is to ensure that digital records retain their values of authenticity through two fundamental elements: integrity and identity. Integrity refers to the completeness and solidity of the record and cannot be unlawfully corrupted or tampered with. Identity refers to the attributes of the record that characterizes it and distinguishes it from other records.

The purpose of the study of Digital Forensic Science is to develop methods for verifying this documentary authenticity by preserving the chain of custody both in the legal area of documentary conservation and preservation. The contribution of the two mentioned sciences (see the next section) establishes itself in giving value to those digital records that are often not considered as sources of proof.

The digital record, unlike the conventional record, still raises some doubt as a source of proof. These difficulties arises when the record is generated in a system, and then, to ensure its conservation, it is migrated to another support:

Every time you migrate a record, you lose the support and just remains the information: it broke the record, broke the source of proof and finally broke its authenticity. Authenticity is only guaranteed through the study of the record and not only of the information. The information has to be fixed in the support and if this support migrates, the fixity has to be documented [8].

With this in mind, the proposal of this research is to analyse the theoretical concepts developed in Digital Diplomatic Science and Digital Forensic Science as a subsidy for digital records to be reliable and authentic from the moment of creation until their access. To accomplish this goal, it will work interdisciplinary with five sciences that will solidify and give a greater understanding to the research problem. 1) Digital Forensic Science, because it is an area that joins the knowledge of Forensic Sciences and Computer Science for the analysis of digital evidence. 2) Diplomatic Science, which analyses the form and content of the record researching its authenticity. 3) Archival Science, been a science that assists in the production and organization of records, without losing sight of the usefulness of new technologies. 4) Information Science, for giving relevant information in its different contexts. 5) Law, because it is a science that establishes legal and juridical issues focused on the documentary context and its privacy. In addition, the InterPARES (International Research on Permanent Authentic Records) surveys, specifically those related to the integrated Digital Records Forensics project, will be addressed, understanding the archival digital record as a potential source of evidence for possible legal and juridical scenarios.
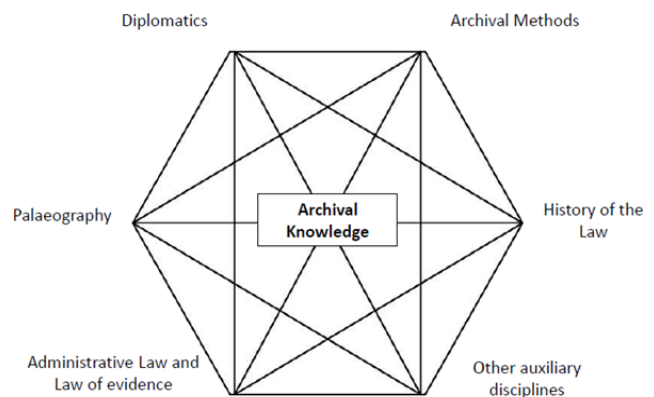

Figure 1. Interdisciplinarity of Archival Science with other sciences like Diplomatics, Archival Methods, Palaeography, Administrative Law and Law of Evidence, History of the Law, and Other Auxiliary Disciplines .

2. Material and Methods

This research is characterized by being a qualitative, theoretical and descriptive-exploratory type. Archival theories and principles will be analysed, starting from the bibliographical research for the delimitation of the study subject and the improvement of the scientific base. Subsequently, the compilation of the data obtained in the bibliographic review will be analysed with the purpose of presenting the results of the theoretical discussion, to answer questions related to the application of Digital Diplomatic Science and Digital Forensic Science in the digital records management. In addition, in the theoretical discussion exists

points of views confrontations, which makes possible not just draw new perspectives for the study of the digital records management, but solve challenges and discuss accurately and consistently the problem. With the delimitation obtained through the theoretical discussion, there is a better viability of reaching the objectives .

3. Results

The Science of Information and Archival Science explores the tools offered by Diplomatic and Digital Forensic Science as an aid to the documentary processes. This allowed the applicability of the mentioned concepts within the processes of the digital record. Initially, a foreign literature was utilized to do a content analysis and determine the progress of Diplomatic and Digital Forensics in this context. The InterPARES (International Research on Permanent Authentic Records) proposals is to analyze the contributions of the Forensic Diplomatic Project. This group was choosen because they are in its fourth phase of the project. Then, it will offer a better understanding of this research field.

4. Discussion

The junction between Diplomatic Science and Digital Forensic Science resulted in the InterPARES research group, the DIGITAL RECORDS FORENSICS PROJECT. It began in April 2008, and involved the Library School of the University of British Columbia, File and Information Studies (SLAIS), the UBC Law School (University of British Columbia) and the Forensic Division Computer Science Department of the Vancouver Police Department. The main challenges analyzed by InterPARES in the areas of Archival Science, Management of Digital Archives and in the legal scope are:

- The identification of records among all the digital objects produced by complex digital systems, and
- The determination of their authenticity:
  - when digital materials are kept outside of the technological environment in which they were produced and/or maintained either by the creating body itself or by third parties like police departments or archival organizations; and
  - when records are of uncertain origin and/or exist in proprietary formats that are hard to maintain over time, thus compromising their long-term research value or their ability to be submitted and/or admitted as evidence in a trial [9].

5. Concluding Remarks

Research of this type will aid in records management and archival processes in several entities, as well as the need to extrapolate its field of investigation to areas not explored in documentary areas, such as Law. Records and systems need to be trusted to carry out the various transactions, and both

Digital Diplomatics and Digital Forensic Science are assisting this intention.

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