InterPARES 3 Project
International Research on Permanent Authentic Records in Electronic Systems

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1.3	2012/2/15	C. Lacombe Rocha	Last revision.

Table of Contents

Report of a case study

A. Outline

Case Study 05 aimed to propose and implement an action plan for the preservation of the grades and attendance report of undergraduate students at the State University of Campinas (UNICAMP), a record that has been created on a computer system and maintained in a databank since 2002 at the Registration and Management Office of the Academic Administration (DAC).

These grades and attendance reports register UNICAMP's undergraduate students' presence at classes and school performance. The data recorded on them is used by the university's Academic Management System to create other records concerning students and teachers, such as transcripts, course completion reports and teachers' productivity reports.

Throughout the case study, the grades and attendance report was analyzed and it turned out that the digital entity did not present some basic characteristics of a record. Thus, some changes in the computer system were proposed so that it could come up with a complete and reliable record.

B. Methodology

The case study followed the methodology proposed by the InterPARES Project. UNICAMP researchers collected data based on specific guidelines defined by the project, aiming to gather information about the context of creation and characteristics of the digital entity. This data collection was carried out through interviews that the researchers held with the personnel in charge of the creation and maintenance of the undergraduate students' grades and attendance reports at the Registration and Management Office and in the IT area in charge of the system.

After data collection, the researchers conducted the diplomatic analysis of the record, according to the template for diplomatic analysis proposed by the InterPARES Project. From this analysis, it was possible to identify some procedural problems in the

grades and attendance reports and to propose changes in the computer system, as well as a plan for the preservation of digital records.

C. Description of context

Provenancial context

DAC integrates UNICAMP, a public institution of autarchic nature under special rule of São Paulo state's government administration. It is UNICAMP's central management and information agency, in charge of registering students and controlling their activities at the university. It operates in the planning and support of UNICAMP's academic activities at the undergraduate, postgraduate (including specialization, medical residency and improvement) and outreach levels. It also subsidizes institutional decisions in a technical way, observing the legal requirements of higher education in Brazil.

Finally, DAC is responsible for system maintenance and for the issuing of transcripts, diplomas, certificates and other reports.

Juridical-administrative context

DAC is regulated by a set of normative acts that supports its role, for example, its inauguration act[1] and national legislation on education[2].

The grades and attendance reports are filled in by teachers for students enrolled in graduation courses at UNICAMP's colleges and institutes, aiming to control students' attendance at classes and to assess their school performance. At the end of the semester, information (final average and attendance) is recorded in the Academic Management System, in accordance with the calendar previously set by the governing bodies.

Procedural context

The undergraduate students' grades and attendance report is created on a specific computer system.

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[1] UNICAMP, GR 205/1975.
[2] Federal law no. 9.394/1996.

The teacher inserts the students' and grades attendance, through an interface in a web environment, after password authentication and in determined periods of the school calendar. When the teacher is unable to access the system, another user, authorized by them – such as course coordinators' secretaries/ assistants –, may have data included in the system.

DAC generates a paper copy of the report and forwards it to course coordinators at the colleges and institutes for conference. When necessary, data changes are made in the system by members of the DAC team with an official authorization from teachers and coordinators.

After final processing, the data on the grades and attendance reports will serve as source for the creation of other documents.

Documentary context

Records management at DAC is within the scope of UNICAMP's Archives System (SIARQ), created by the university council in 1989. The record in study is classified under the fonds "State University of Campinas," group "Dean of Undergraduate Studies," subgroup "Academic Board (DAC)" and series "Grades and attendance reports."

Technological context

The Academic Management System's set of databases comprises: a comprehensive database (registration of students, grades, subjects etc...), updated daily; the database of the school transcript (data and table structure), updated daily; and the database of the course completion report, for consultation by students via Web in HTML format, updated every six months.

The grades and attendance reports are presented in HTML to teachers, which allows them to search through it with the parameters "subject," "class" and "school semester / year."

The data is kept in the Academic Management System, in database tables, whose main access points are the student's RA (academic registration number), name and course.

The digital grades and attendance reports are created from the execution of a feature of the Academic Management System, which selects the data stored in tables from DB2 databases.

The print files (PS - PostScript) generated by DAC are produced from data retrieved from the grades and attendance of undergraduates, according to the subject, class and school semester / year selected.

D. Narrative answers to the applicable set of questions for researchers

The grades and attendance reports are created by teachers for students enrolled in undergraduate colleges and institutes of the university, and make the registration of their presence rate control and of their academic performance assessment, so as to comply with national education standards defined in specific legislation.

The document appears on screen in HTML format, from a query made in the database. The query can be performed by the teacher and the staff of the DAC, with the following search parameters: "subject", "class" and "semester/school year."

The HTML file has information about provenance, authorship, action performed, creation and transmission, such as the logo with the name of the organization, the document title, the name of the subject and its teacher, the academic semester/year, hourly load, students' names, workload, the situation of the student (pass or fail), and the date of creation (entry of data in the Academic System).

Documents are identified in the database by means of the following set of related data: subject, class and semester / school year.

The system automatically records information about the access date and the dates when data was entered into the system, as well as password control.

The system performs access control and operations to create or change data restricted to authorized officers of the Registration and Management Office and the university's computer center. There are procedures that allow the tracking of events for audit purposes.

The system allows correction of data, which can only be done by the Registration and Management Office, upon request by the teacher responsible for the course / class, with

the approval from the course coordination authority.

The grades and attendance reports are printed and filed. The requests of correction mentioned above are attached to the printed version of the report, but new versions with changes in grades are not printed.

E. Narrative answers to the project's applicable research questions

Which are the regulatory, auditing and policy making bodies that need to be sensitized to the importance of digital preservation, and what are the best ways of influencing them?

The organisms to be sensitized to it are those related to the strategic planning and the making of policies concerning archives, information and ICT, which are, in the context of a university, the higher deliberative bodies, such as the university council and colleges and institutes' boards. One way to influence them is to create, within the archival field, committees or groups composed of teachers, researchers, students and managers, in order to develop studies and proposals for digital preservation. Then awareness may reach the organization's areas horizontally and vertically, depending on their participation in these committees, which should include members of academic and administrative bodies (including maintenance and supervision). Those groups may jointly propose, therefore, actions and procedures to the higher and decision-making bodies for the resolution of the management and preservation of records.

How and when should these archives or programs prepare themselves for digital preservation?

The institutional archives should prepare guidelines and best practices for preservation, enabling record creators to carry out, in their local archives, measures to ensure the reliability, authenticity and access of records, from the time of their creation and for as long as necessary.

What differentiates the preservation of digital records from that of any other digital entity for which the archives might be responsible?

The preservation of digital records, unlike the preservation of other digital entities, must be able to guarantee the basic characteristics of the archival document, particularly

what comes to its fixed form, stable content and archival bond with the other documents that register the action.

What are the nature and the characteristics of the relationship that each of these archives or programs should establish with the creators of the records for which it is responsible?

There should be partnership between creators and archives in building solutions for digital preservation. Archives and creators must know each other and the former should provide guidance on the management and preservation of archival documents; the latter, in turn, should provide information about their operations and documents, allowing the identification of those which are archival, and be willing to incorporate archival knowledge in their work processes. That interaction is required for the joint development of solutions that enhance the creation and filing of records, in order to maintain their reliability, authenticity and access.

What action plans may be devised for the long-term preservation of these bodies of records?

The grades and attendance report of undergraduate students was considered a potential record, because it meets some of the required elements and attributes to a record, such as fixed form and stable content, but it does not present explicitly, in its metadata, the archival bond with other documents that share the same action. It was also verified that the system and its procedures need to be strengthened when it comes to the capture of records, system security and preservation.

The action plan designed by the study group included:

- Clarify, by means of metadata, the archival bond held by the digital entity with other records.

- Change the system so that the record can be viewed with the layout it had at the time of its creation, so that the documentary form is not altered.

- Allow the system to register alterations, in order to record the changes in the students' grades, but without changing the layout of the original document issued by the teacher. For this, the altered grades should be displayed in the report as a change log.

- Assess system security and reliability of the records through: implementation of an audit trail to allow tracking of events; definition of metadata of agents (use and tracking); and definition of a security policy targeting backups.

- Define the strategy for management and preservation in order to consolidate the previous actions and prospect instructions for procedures, such as: development of a manual of procedures, a preservation solution for the grades and attendance reports and related documents, the monitoring of file formats and the technological environment, staff training, etc.

Can the action plan chosen for a given body of records be valid for another body of records of the same type, produced and preserved by the same kind of organization, person, or community in the same country?

Yes, it is possible, if the conditions are the same as the ones raised in this case study.

Can the action plan chosen for a certain type of record or system be valid independently of the creating or preserving organization and its context?

It is possible that other organizations that have the same characteristics can adapt it to their realities.

How can records professionals keep their knowledge of digital preservation up-to-date in the face of ongoing and increasingly fast technological change?

Records professionals can keep up by participating in open study groups (including networks), courses, conferences and meetings on the issues, or even by establishing programs and forming study groups in their own organizations, in partnership with national and international projects.

F. Diplomatic analysis

Grades and attendance reports were considered potential records, issued by the teacher through the academic management system. It is maintained in the system in its stored form, and has as components a table with the data (which cannot be changed), a template, and the routine used to display it on screen, in addition to the metadata that

registers the issuing of the document (including date / time when the teacher issued the report in the system). The document shown is not maintained; each time a query is made, the system generates a copy of the manifested record.

The diplomatic analysis showed that the document meets some required elements and attributes of a record, as fixed form and stable content, and that it does not explicitly hold any archival bond with the other documents that participate in the action, namely: requests to change grades, decisions of teachers and coordinators about changing grades and attendance data, and updated school transcripts.

So it is necessary to implement some changes to the system, in order to register the archival bond with other records that participate in the action, and ensure the fixed form and stable content.

We pointed out two options for the preservation of the grades and attendance reports of undergraduates:

- to preserve the digital components of the record issued by the teacher to ensure the preservation of its stored form; or
- to set aside the grades and attendance report in its manifested form (PDF, XML or some other format).

Furthermore, to ensure that the archival bond is explicit, it was recommended to record, in metadata, the relationship of the documents with responses from teachers and coordinators to the requests of changes in grades targeting the same reports.

G. Conclusion

The case study proved to be possible to apply the body of concepts, principles and methods of the InterPARES Project at the university. DAC/UNICAMP is a creator of digital records, and SIARQ's Central Archives is their preserver. After the identification of the digital record and its contexts, as well as conducting the diplomatic analysis, it was concluded that the grades and attendance reports are potential records because they do not meet the characteristics of fixed form and stable content, and the archival bond with other records that comprised in the activity action is not explicit. In addition, the group identified

the need to plan improvements regarding the capture, system security, maintenance and monitoring of reformatting processes, in order to increase reliability.

Based on the guidelines outlined in the study of the InterPARES, the team in charge of the university's academic management system has already made some decisions that are beginning to be implemented:

- the record will be filed in its manifested form, i.e. kept in PDF format, accompanied by a set of context metadata;

- the history of changes in the record will be retained;

- the maintenance of the archival bond will be made by inserting metadata identifying the offices that allow the amendment of grades;

- security requirements should be strengthened for the identification of agents and the implementation of audit trails; and

- monitoring file formats and the system itself will be subject to applications to be developed from the digital preservation requirements duly published by reputable organizations.