

SECRETARIA ON-LINE FROM ISCAP: A CASE OF INNOVATION

Rui Humberto Pereira

ISCAP – IPP

Rua Jaime Lopes Amorim, s/n

4465-004 S. Mamede de Infesta

Portugal

Ana Azevedo

ISCAP – IPP

Rua Jaime Lopes Amorim, s/n

4465-004 S. Mamede de Infesta

Portugal

Olímpio Castilho

ISCAP –IPP

Rua Jaime Lopes Amorim, s/n

4465-004 S. Mamede de Infesta

Portugal

ABSTRACT

Like many other higher education schools, ISCAP's population has grown at a rate of almost 100% in the end of the twentieth century. Its administrative structures were reinforced, but it was not in the same proportion. Face to face with the inability to resolve the problem, the administration decided to implement a computer based system, available in the Internet.

In a first stage, in 1997, the system was implemented as a services support. The next stage, in 1999, proposes to increase student services quality. A project that aims to bring student services available on the Internet begins to be developed.

KEYWORDS

Web services; SRM

1. INTRODUCTION

ISCAP (Instituto Superior de Contabilidade e Administração do Porto) is a business higher education school from the Polytechnic Institute of Porto. It offers courses in the areas of Accounting and Administration, International Commerce, Marketing, Business Communication, Administrative Assistance and Translation.

The ISCAP management structure is strongly centralized in the Directive and Scientific councils. This is not very usual for a school with this dimension, and has got some advantages and some disadvantages: it is easier to identify who is the person in charge, but on the other hand, with an increasing in the amount of the services that are undertaken, it is difficult to make decisions on schedule.

ISCAP's history goes back to the nineteenth century. Until 1995 ISCAP's population was stable. In 1995, with new facilities, the number of students and teachers began to grow at a very high rhythm. Nevertheless, the number of employees has not grown in a proportional way. Furthermore, it was not possible to hire a

significant number of employees. In the beginning of the project the school had about 5000 students, 300 teachers and 100 employees. Actually the school has around 3700 students, 200 teachers and 60 employees.

In this paper we will begin to present the motivations that lead to development of the system. Then we present shortly the two stages necessary to do it. Next we analyse some impacts of the implemented system. We finish by presenting some conclusions.

2. DEVELOPPING THE SYSTEM

2.1 Motivations

As we have already mentioned in the introduction, the school has a lack of employees to ensure the success of the students' services. The main issue related with the lack of employees is the opening hours for students' services. This aspect gets worse if we take into account that classes go from 8:00 AM to 11:00 PM, because the school has got two types of courses: daily courses and night-school courses. In this manner, services opening hours must consider this constraint.

Another constraint is that student services serve as a communication, storage and management channels of a significant part of school's information. Considering this constraints it was necessary to take a step that would offer a solution to all the problems that occur in the school. The implementation of an integrated system, supported by information technologies was the chosen solution, in spite of the administration recognition that a significant part of the staff was not a good user of information technologies.

Two interconnected projects were born. This paper will explore the interconnection between the two projects and the ways in which they are linked.

2.2 The SGA (Students Management System)

The first system to be developed, named as SGA (students management system) appeared in 1997, to answer the needs of students services. The objective initially proposed was to offer the academic community a system that could do almost everything related to academic services, namely: registry of all the personal data about students; enrolment; assessment register; emission of examination certificates and diploma; emoluments registration; document registration; and others. The SGA system consisted in a collection of applications developed in Oracle Forms, which allows an effective management of the entire student's information. Since the information included in the system is critical, the access to this system is restricted to some employees and, for security issues, it is located in an isolated network. By the security requisites, nowadays, this system also works as the official repository of the student's information.

Because ISCAP is a school, the management of the students' information is crucial, but it is not enough. Other specific systems like: SGH (classes schedule management system), responsible for the management information of classes schedule, SGV (exams management system) for schedule exams and management distribution of students and teachers, and the SGRH (human resources management system), to the support the administrative tasks on human resource area, also play important roles on the global system.

For several years now, many of the functions that were available, which naturally belonged to those of the support systems, have been transferred to a web environment, capable to be accessed from inside and outside of the campus.

2.3 The *Secretaria on-line*

In the beginning of 2000, another project was developed, named as "Secretaria on-line", which aimed at enabling the access to school's information from the staff and facilitating the communication and information transfer to all community (students, teachers and staff).

The objectives initially proposed were:

- To enhance the quality of students services: reducing the waiting time, reducing the number of visits, facilitating the communication teacher/school/student and vice-versa, reducing the waiting time to handle a certificate or any another document;

- To overcome critical periods in the services schedule: eliminating chaos or out of control situations, facilitating the assimilation/reception of the enormous amounts of information that sometimes arrives simultaneously;
- Keep the academic information with a high quality level: minimizing the number of mistakes or excluding them, detecting flaws which will conduct to irregularities in students situations and correcting them;
- Improve employees working conditions: reducing the number of overtime working hours for attendings and data introduction, promoting the communication and information sharing between different school services.

The school proposes to reach these objectives in four stages, adjusting to the proposed objectives. In the first stage the school proposes to stimulate students and teachers to use the system and to acquire the habit of using it. In the second stage the aim is to make the service more attractive and useful. In the third stage it intends to create means for the students to interact with the system, requesting for a certificate or enrolling for examination, for instance. The fourth stage consists in the system consolidation and the creation of advanced services, like the interaction with SMS, telephone and SIBS (automatic payments). Nowadays the system offers to the users a great amount of functionalities.

The developed system consists on a web application available in the internet for all the academic community of ISCAP. Being supported by a J2EE (Shannon, B., 2003) platform the code is all written in Java language and some parts use code from open source projects. The work it was oriented to develop a framework on academic information management, capable of supplying a large spectrum of reusable software components. Based on this framework, applications of any type of environment can be created, like web pages, SOAP Web Services Web, Java desktop applications, and others. This framework implements the business logic e data model layers, allowing a simple and agile way of adaptation to the many changes on academic life management.

The main application, developed on the top of this layer is Secretaria On-Line, a web application that follows the MVC web pattern development, using Servlets and JavaServer Pages (Hall, Marty, 2000). Beside, there is an A2A integration module based on the Axis platform (<http://ws.apache.org>) that allows other systems share the data and the business logic.

Due to the intense utilization of the web application, in particularly on the last day and hour of any important process, like exams registration or class enrolment, where a large number of students login on system at same time, it was important to implement some cache techniques, use a load balancing architecture that increase the fault tolerance and capacity to attend those large number of simultaneous requests. As front-end system, a Apache web server receive all HTTP (Berners-Lee, T., 1997) requests, serves himself all the static contents and takes from one of the applications servers, six Tomcat (<http://tomcat.apache.org>) instances, distributed by two physical servers, the dynamic contents JSP pages. The data persistence layer there is an Oracle database server. The authentication information for the users is registered in an OpenLDAP (<http://www.openldap.org>) system.

To reduce the utilization level of the web interface, two other new services had been implemented. The first was a SMS gateway that can send notifications to the users. The main propose was send classifications avoiding the students to systematically go to the system for se if there classifications already been putted by the teachers. Other was a service available from simple phone, where the user by dialing numerical digits can hear him classifications and other personal information's.

Naturally, the security it deserved an especial attention and is not concentrated on a unique initiative but based on the following complemented actions: All requests are made in HTTPS (Ragget, Dave et al, 1998) using a commercial certificate; physical separation and an information circuit that grants that safety (from external attacks) to the student information, on the official database (on the SGA); Restrict access, to machines and people, to the on-line and off-line databases.

Since the beginning of its development, the response to the e-learning needs was a key area not forgotten. But while academic information management is very specific, with a lot of unique requirements, the e-learning area is very identical in all institutions. Therefore, the followed strategy was not to develop an e-learning system, or extend the development to that area, but to integrate with a successfully existing system. The first system was WebCT, but in the year of 2004 Moodle was chosen to be the e-learning platform (Peres, P. et al, 2006), because it is open-source, it facilitates the task of integration and naturally due to its cost.

2.4 Some Impacts

We will now analyse the impacts of the developed system, after more than seven years of utilization, regarding students, teachers and student services. We present a table (table 1) that enables a comparison of the most critical aspects that affected the services and that disrupted teacher's activities.

Table 1. A comparison of the most critical aspects that affected the services

| | Before | Now | | |
|--|--|---|--|--|
| | | Services | Teachers | Students |
| Communication | Limited to the opening hours for students' services. Urgent information was communicated by the use of affixes or by phone. | Availability of new means like SMS and a news page. | Easy access to the information. | Easy access to the information. |
| Introducing Assessments in the database | It took months until the 70.000 assessments (each year) would be available in the database. There were human resources permanently affected to that task. | Staff that was doing this task, shifted to other important tasks. | The manual introduction was stopped, reducing significantly errors. | Immediate assessments availability. |
| Student's listing | The lists were emitted in the beginning of each semester. Changes were not known by those who were interested. | They stopped emitting the lists and therefore stop attending teachers that needs the lists. | Information available on-line. | Not applicable. |
| Timetable | Changes were problematic. | Facility in changes. | Easy access to changes. | Easy access to changes. |
| Examinations enrolment | Hundreds of students were attended during several days. The lists of enrolled students often were available only after the examination | No need to services intervention. | Immediate availability of the lists of students enrolled. | Very easy to enrol examinations. |
| Examinations Schedule | The schedule was sent by mail to teacher's houses. Changes were almost impossible. | More time available to prepare the schedule. | Easy to access the schedule. | Easy to access the schedule. |
| Enrolment renewal, indicating class | Hundreds of students were attended during several days. Only a few weeks after the beginning of the semester, the lists were available | No need to services intervention. | Lists and photos of students available in the beginning of the semester. | Quickly access their enrolment validation. |
| Personal data actualization | Difficult process. | No need to services intervention, in many cases. | They can change personal information easily. | They can change personal information easily. |
| Data quality | Data containing many errors were incomplete. Difficulties in error detection. | Less delays coming from information flaws. | They warn the services about flaws they can not correct. | They warn the services about flaws they can not correct. |

3. FUTURE WORK

In a near future (starting this year) the school intends to progress with another interrelated project, incorporating Business Intelligence functions into the system, by implementing a new module named *Observatório*. With this new project it will be possible to change the way that the planning and analyses activities are done, in order to better understand what is happening and to acquire some capability to preview the trends.

Based on a prototype implementation, on a parallel project (Rocha, G., 2006), a new direction on the development will be the separation of the business logic in two distinct levels. That will give more flexibility and adaptability to the changes on business rules describing it on a processual description language based in XML (Bray, T. et al, 1998).

4. CONCLUSION

It is possible to conclude that the implemented system led to a solution of some of the school's problems, introducing significant advances in service's quality. Nevertheless, things have not always occurred as expected. In spite of that, we present the following conclusions:

- Adherence seems to present difficulties, in a school without a technological tradition. But, in some situations adherence was substantial;
- Services are strongly interdependent;
- Importance of the system has been full integrated with back-office systems (SGA, SGRH, SGH and SGV), other on-line systems like e-learning (Moodle), institutional web site, SMS service, automatic telephone service, bank services for payments and LDAP for user authentication.
- The implemented service allowed a minimization of the negative impacts of the lack of employees, having positive reflexes in services quality, since it allows a significant reduction of the amount of work of the employees, and to set them free to do other tasks;
- Because any academic institution has very specific problems, it is forced to develop by itself management tools, and, in this process, the open-source software can reduce the developing cost.

The SRM promotes student retention (Shaik,N., 2006), in a scenario where all institutions compete to get the students, we verify that this kind of strategy is another tool to go against that tendency and help the school dealing with the new reality.

REFERENCES

- Berners-Lee, T. et al, 1997. *Hypertext Transfer Protocol HTTP/1.1*. RFC 2068. MIT/LCS.
- Bray, T. et al, 1998. *Extensible Markup Language. Recommendation (XML) 1.0*. Available at <http://www.w3.org/TR/1998/REC.xml-19980210>.
- Hall, Marty, 2000. *Core Servlets and Java Server Pages*. Prentice Hall.
- Hickman, Kipp E. B, 1995. *The SSL Protocol*. Available at http://www.netscape.com/eng/security/SSL_2.html.
- Peres, P. et al, 2006, *An Experience of the Use of "Moodle" at ISCAP - A Case Study* WEBIST (2), pp. 418-422, INSTICC Press
- Rocha, Gilberto, 2006, *Implementação de um modelo baseado em XML para suporte da dinâmica processual de negócio*, XATA 2006
- Shaik,N., 2006, *Service Center to Promote Student Retention.*, 21st Annual Conf. on Distance Teaching and Learning
- Shannon, B., 2003. *Java™ 2 Platform Enterprise Edition Specification, v1.4*. Available at http://java.sun.com/j2ee/j2ee-1_4-fr-spec.pdf