

MANAGEMENT INFORMATION SYSTEMS IN ROMANIAN UNIVERSITIES

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Abstract: This paper shortly presents the situation of the Romanian universities regarding information systems implementation and deployment. The information presented is the result of a study regarding the current state of the Romanian universities in the process of data and information system integration, performed at the end of 2007 in 35 accredited universities. This study was used as a base for identifying and analyzing the main factors of influence for developing an integrated university environment and for identifying concrete action directions for accomplishing that integration.

1 INTRODUCTION

The implementation of an information system dedicated to the university management is nowadays a fundamental option for the greatest majority of the universities that understood the new trends at international level. A higher-education information system can be used as a vehicle for professionalizing and transforming the traditional universities and for developing an integrated and standardized Romanian higher education environment, in the European context.

The present paper will present the results of a first phase of a national research project, "Integrated Information Solutions for Competitive Management in Romanian Universities". The objective of this first phase was to perform a study of Romanian universities in order to obtain a complete view over the present situation of existing management information systems, their integration level and the problems faced in using those systems.

The following phases will analyse the solutions that foreign universities apply, and finally make a pilot implementation in the Academy of Economic Studies of Bucharest.

2 PROBLEM FORMULATION AND GENERAL CONCEPTS

Identifying the most important specific aspects related to the implementation of university governance systems in Romanian, and generally speaking Eastern European, universities is the focus of our current research. Local universities have different process from their Western counterparts and that is why implementations of solutions developed in Western countries had limited success.

The incompatibility with international solutions has led to a situation where local universities are using a high number of various small and poor information systems developed in-house or by small local companies. Almost every faculty or department has its own software applications, developed in-house, applications that use various operation systems, tools, databases and protocols. Those applications are managed by that specific faculty/department and there is no integrated view over the activities developed in the university.

Our team has achieved a study about the current state of the Romanian universities in the process of data and information system integration.

This study is going to be used as a base for identifying and analyzing the main factors of

influence for developing an integrated university environment and for establishing concrete action directions for accomplishing that integration.

We used as a starting point the list of all Romanian universities, offered by the Ministry of Education (Romanian universities), which consisted of 56 accredited state universities, 32 accredited private universities and 24 temporary accredited private universities.

3 APPLICATION INTEGRATION LEVELS

Through our research we will use the conventional three-tier approach. When trying to connect to a certain application, its architecture must be considered. Most applications have a three layer structured architecture (Microsoft - Integration Patterns): *Presentation level* – is the level that displays the information for the final user and allows him to input data; *Business logic level* – contains the business functions that action on business data; *Data level* – accomplishes the persistent data storing in data stores. This level is also called resource level.

Similarly, there are three connection ways between applications and integration level (Microsoft - Integration Patterns): *Presentation level integration* – the integration level can extract information from the user presentation level using a technique called “screen scraping”; *Function level integration* – the interaction between the integration level and the business logic level is accomplished by application or service interfaces; *Data level integration* – the integration level can move data to and from data level.

4 SOFTWARE SOLUTIONS FOR HIGHER EDUCATION MANAGEMENT ON ROMANIAN MARKET

The first phase of our research was to gather data about the current commercial systems used by universities. As expected, these were marginal applications developed by local companies with a limited presence. Our field studies revealed that the number of players on the market was reduced, the following being the most representative:

SICOB (Information System for Public Organization Management) should be a result of a project financed in 2001 by the Ministry of

Education in a first attempt of covering the gaps the Romanian universities presented in the field of applications for institution management. It was developed by a Romanian software company and proposed three modules: Financial, Research and Payments. This solution was implemented in about 40 public universities and some of them are still using it.

University Management System (UMS) should be an integrated information system dedicated to higher education institutions (public or private). Developed and provided by a Romanian company, Redpoint SA since 2004, UMS ensures the management of academic processes, students, academic staff, tuition fees, admission process, graduation process, scholarships, lodging and accommodation, diplomas, etc.

Naum Consult System was developed by Naum Consult SRL and has been provided since 2003. The system has modules for: accounting, provision management, assets management, student management, HR, financial.

GESCO 2001 should be an information system for the management of higher education institutions schooling process developed by a Romanian company, Genisoft Group SA. The system offers many facilities such as: student performances management, budget assessment at department, course and allows a correlation with data from SICOB accounting module.

5 STUDY RESULTS ANALYSIS

5.1 Implemented Solutions Analysis

The study was conducted on a number of 35 of the Romanian universities, including both public and private institutions and the full range of Carnegie segments. This can be considered a representative sample of Romanian universities, encountering a percent of 31.25% of total accredited universities.

This study addressed a number of questions such as:

- What kinds of information systems were developed within Romanian universities and for what functional areas?
- Do those information systems succeed in fulfilling the information requests of Romanian universities?
- Which were the major suppliers of software solutions for Higher Education Management on Romanian market?

Almost all universities have a financial solution, and Sicob was the major vendor for the financial

module, encountering 36% of total number of implementations, while Naum Consult follows with a percent of 12%. Anyway, most universities use self-developed solutions for financial and accounting management activities.

Most universities felt the need to implement a Students management module, so that 77% of universities currently use such a module. 41% of those preferred the UMS solution, 11% chose Gesco, 11% chose Naum Consult and there is an important percent of 37% that still use self developed solutions. Although the Student module it wasn't very popular two or three years ago, the universities have caught up and now most of them use a Student solution, even if not a professional one.

Self-developed solutions are very popular for Financial and HR/Payrolls modules, as they were preferred in order to make cost savings but also to cover the incomplete functionality of the existing software. Another important remark is that big universities use all the HE ERP modules, commercial or self developed. Small universities, on the other side don't use commercial solutions, because of their cost. Public universities always use Financial and HR/Payrolls modules, regardless of developer, as they have to make mandatory specific reports. Our study indicates that the number of players on the HE ERPs market is small. Most universities use in-house or low-end solutions. The chart 5.1 presents a comparison between the main four software solutions used in Romanian universities.

Table 5.1: University application analysis by architecture and implementation technologies.

	Gesco	UMS	Sicob
Operating system	Windows 2000 Server	Windows 2003, Unix, Linux	Sun Server
Database	SQL Server	Oracle SQL Server MySQL	Progress Workgroup DB
Development tools	Microsoft .NET (ASP, Web, XML, C)	Java J2EE, SWING, JSP, Struts, EJB	Progress Actuate Developer
Reporting and analysis	Embedded, based on XML, self transfer in .pdf or .xls	Embedded, integrated with MS Office	

5.2 Integration Level

A real process level integration is presented only by University Management System solution. As its developer, the company Redpoint, initiated collaboration with SAP corporation in order to develop the following modules: financial accounting, management accounting, payroll, virtual library, this solution has a big chance to become a complete and competitive software package for university management. In Naum Consult we have a partly data level integration by using a common database in several different modules. SICOB, on the other side, is a simple accounting solution, so the integration can be made only external, by another application or support platform. As for the university in-house solutions, there the integration is almost inexistent. The modules doesn't communicate between them, at most they are exported from one module, processes and transformed and then imported into other modules.

5.3 The Example of the Academy of Economic Studies, Bucharest

A preliminary analysis of the information system in our university, the Academy of Economic Studies, revealed the existence of 7 major independent information systems, which are independent and communicate with each other only by export files or specially developed transfer programs. Here is a short description of those systems and their relationships with each other.

1. **Student Management Application** is a client-server application that uses a Microsoft SQL Server 2005 database. Its interface was developed in Visual Fox Pro and Visual Basic. It includes three modules:
 a. *Student Master Data*: includes student information, faculties, degrees and programs information, their curricula, courses etc. It uses a specially developed transfer program in order to extract information from Admission Management Application.

b. *Student Academic History*: includes a list of all grades up to and including current term, earned credit points, reprogrammed exams. The secretaries are responsible for updates.

c. *Student Bills*: includes all kind of student fees, charges, payments. Data are updated by the pay offices (approximately 10 workstations).

2. **Student Admission Management Application** uses as inputs data regarding student personal data, their admission options, faculties and specializations, student photos etc. It provides basic

data for the Student Management Application and it uses outputs from Student Bills module, in order to check out tuition fees payment. This application was developed entirely in Visual Fox Pro.

3. **The Academy Web Site:** centralizes all the relevant information for various visitors category, students, inside and outside the university. Data are not automatically displayed by interrogating a database, but manually filled in by secretaries and then converted to HTML format. As a result, there is a high incidence of human errors in data and many out of date or incomplete on-line information.

4. **Social Information System** was developed in Visual Fox Pro and includes four modules: *Lodging and accommodations*-student lodging on university campus; *Lodging Fees*; *Scholarships* and financial aids; *Transportation reimbursement*-public transportation expenses reimbursement. It imports data from the Student Management Application.

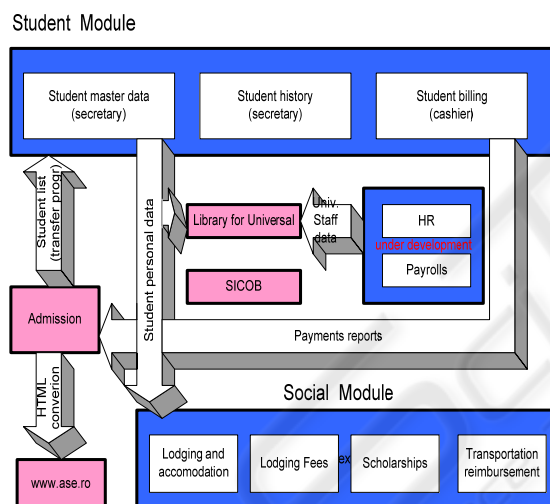


Figure 5.1 Communication flows in the applications of the Academy of Economic Studies.

5. **SICOB** is used for financial and accountability specific operation.

6. **Human Resources and Payrolls Application** uses Microsoft SQL Server database and includes 2 specific modules: *Payrolls and Human resources*.

7. **Library for Universal (L4U):** a classic system for library management that uses data exported from Student Management Application and personnel database, after a previous filtering and transformation by a specially designed program.

There is also Web-based Virtual Campus management application for distance learning programs.

6 CONCLUSIONS

The Romanian learning system was recently integrated, at least at a formal level, in the European learning system, automatically bringing the need of adapting to European practices (e.g. ECTS).

The capacity of Romanian universities information systems to respond to the demands and the challenges of European education system was very modest until now. Universities should realize that they are not so drastically different and given that, they should collaborate in order to influence vendors to become more sensitive to higher education needs. This way, ERP vendors should provide some best practice models to reduce the costs of ERP implementation.

European integration of Romanian higher education system might benefit from the support of European funds. But, in order to access the European funds, the universities should manifest interest, make congruent efforts and put some pressure on the decision factors, on one side, and, on the other side, the political support is also very important. For the moment none of them seems to be strong enough.

REFERENCES

- Ana-Ramona Bologa (Lupu), ERP for Romanian Higher Education, the 8th Economic Informatics Conference, "Informatics in Knowledge Society", ASE, Bucharest, p. 205-210, May 2007, ISBN 978-973-594-921-1;
- Marti Harris, Michael Zastrocky, Jan-Martin Lowendahl, *Magic Quadrant for Higher Education Administrative Suites 2006*, Gartner Industry Research 16 September 2006;
- Ion Lungu, Ana-Ramona Bologa, Adela Bâra, Vlad Diaconița – *Integrarea sistemelor informatice*, Editura ASE, Bucharest, 2008;
- Microsoft - *Integration Patterns* <http://download.microsoft.com/download/a/c/f/acf079ca-670e-4942-8a53-e587a0959d75/IntPatt.pdf>;
- The list of accredited Romanian universities, <http://www.edu.ro>;
- Ana-Ramona Lupu, Razvan Bologa, Gheorghe Sabau, Mihaela Muntean, *The Romanian Universities in the Process of Data and Information*, in The Proceedings of The 7th WSEAS International Conference on Artificial Intelligence, Knowledge Engineering and Data Bases (AIKED'08), Feb. 2008, Cambridge, U.K., p 527-532.