Impact of the Information System on the Pedagogical Process

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Abstract: The pedagogical practice in universities is changing faster than is often perceived by the Faculty as a whole, due to the high level of autonomy individual professors enjoy. The paper discusses to what extent the existence of a university information system is contributing to that change in the Faculty of Engineering of the University of Porto.

The information system (SIELEP) has been running since 1996 and it has grown to more than 30 integrated modules. Although since the beginning its goals included to improve teaching and learning, research and development, the first phase of its development has mainly concentrated on recording and distributing administrative information about the school’s activity and on supporting the school management. However, several implications of its use are already noticeable in the way professors teach and students learn.

The effort of building an integrated and coherent information system is paying back in terms of credibility and adhesion. It is thus becoming a common patrimony for teachers and students what facilitates the communication, the availability of contents, and even the assessment. The system constitutes an important tool to support the evolution of the pedagogical process and is expected to contribute to the continuous education effort.

Communication

Perhaps the single most surprising result of the first five years in operation of SIELEP is the increase in communication, induced by the system, among the students, and between students and teachers. This is a direct consequence of the integration between the course and class enrolment modules and the dynamic mail distribution lists.

The main motivations for the former were to perform the record of enrolments in courses and in specific classes in such a way that the number of mistakes gets minimized while at the same time reducing the amount of repetitive administrative work. For example, the student is constrained to register first on the more basic courses of his programme, where he did not get approval yet, before taking the more advanced courses. Enrolment in specific classes is done in two steps: first, the students express their preferences for certain timetables using a Web form and then an allocation algorithm fills in the available classes according to the criteria established by the programme director (consider first the students with more classes in the same timetable, or those with a better classification). In both examples, the information is stored in a database from which lists of students are produced when needed. These lists are available on the SIELEP and always up-to-date and are used to control presences or to prepare assessment datasheets. The administrative staff is no longer required to print and distribute the lists and so is freed to help the students in more demanding tasks.

The modules producing these lists are integrated in a system containing student contact information, in particular e-mail, and a dynamic mail module allow to send a message to all or part of the elements found by a query to the database (see Figure 1). This fact, suggested as a by-product, very soon became very popular as it offered, for free, a direct way to reach all the students in a certain class or course [1]. In general, it offers the ability to replicate a message to everyone in an arbitrarily selected group.

Figure 1. Dynamic mail module

This makes feasible and encourages the use of electronic mail for specific course matters, increasing the communication between everyone involved and thus improving the pedagogical environment.

It also makes easy the establishment of private as well as public discussion lists. Belonging to some of them is determined by the present status and characteristics of someone, instead of an explicit subscription. The former are being used to enhance large group work, the latter for hot subjects among the academic community.

Contents

The system offers a standard Web page for each course in the Faculty programmes (see Figure 2), based on official information about its goal, contents, bibliography, assessment, etc. The mere existence of this course form, which is due on its first lecture, requires a certain amount of preparation and establishes the rules applicable to the course. It helps the students to understand the goals and plan the work.
The SIFEUP collects the course form for each course occurrence, typically once a year, so some historic trace can be found. As the course contents usually evolves by small steps, the system presents the teacher willing to prepare the following semester a course form already filled in with the last year information to which he must add just the changes.

One field that may be specified is the URL of a complementary course site, under the responsibility of the teacher. The course form represents the minimum acceptable, but it is extensible, the teacher’s creativity being the limit. A considerable number of such sites already exist. Some teachers use it for summaries, teaching support materials, exercises, previous examinations, assessment results or links to relevant sites. The diversity is so big that it is not realistic to standardize its components. However, in order to help those less able to produce sites, some example templates could be offered with the above mentioned sections already structured. It would have the extra advantage of harmonizing the design.

Using the SIFEUP as a backbone where the complimentary sites can be hooked on, the students know where these pages are and get used to consult them. Very fast, these sites become focus points for the course. Some concern exists that the students may be relying so much on this kind of sources that they may be making too little use of more structured and fundamental alternatives, like books.

**Assessment**

The assessment is changing too. As every student has an official Web page, it is becoming common that the result of certain types of coursework be stored in it, where the teacher eventually evaluates it. This kind of practice has the extra advantage of training the student on using communication techniques, nowadays so important.

The final classifications students get on each course are accessible through the SIFEUP in two different perspectives.

The on-line availability of the student academic record enables the teacher to provide more adequate answers to the individual questions, personalizing their relationship. Access to this record is restricted to the student and the teachers, though some argue that it constitutes an unnecessary disclosure of personal information.

The same data is also presented from a completely different viewpoint, as a histogram of classifications for each course occurrence and a pie chart highlighting approvals, failures and not assessed (see Figure 3). These two graphics are part of the course report, due after the last examination, and including the teacher’s comments on the adequacy of the course goals and contents and justification of the results. The course report is also kept in the SIFEUP but the teacher’s comments are reserved for the programme director. Some statistics comparing courses are available.

**Figure 2. Standard Web page of a course**

**Figure 3. Course performance statistics**

The course report can be seen as a self-assessment of the course performance. On the other side, the students are invited, at the end of each course, to fill an evaluation form concerning the teachers and the course. The detailed results are available to the respective teachers and programme director. The other SIFEUP users are allowed to see results aggregated at the course year level.

Both assessments, by the students and the teachers, of each course performance, though only partially published, work as a stimulus for improving the teaching process. They trigger spontaneous change of behaviour in certain cases and support corrective measures from the management in others.

**Infrastructure for evolution**

Another benefit from designing a coherent information system is the easiness of integration of new modules that, building on the previous structures, cover new functionalities and thus are able to account for the system evolution.

Some examples of modules that were not initially planned but helped to create a comfortable learning environment are the record of fees payment, through ATM machines or bank check, and the display of the current position of the printing quota.

**Continuous education**

Prospective studies point as an ineluctable trend the increasing role that the continuous and long distance education will play among the university activities.

From the viewpoint of SIFEUP, there are two kinds of possible continuous and long distance education students, subject to different treatment:

- former FEUP students, about whom some information exists on their academic record, professional career or post-graduate education, and
- other persons willing to improve their knowledge and capacities in the areas of competence of the Faculty.

With respect to the later, the generic information the system offers on the Master programmes and the short courses may be a first step to establish pedagogical links with them. For the former a lot more specific treatment is additionally required, based on persona-
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lised mailings and offering of concrete advantages like certain Inter-
net services, job procurement, etc.

A strong investment is required on creating contents for long-
distance education. However, in a university, preparing for that future
is better done through a step-by-step process based on the tradi-
tional courses, progressively adapted to the on-line environment,
than by the strategy of designing courses completely from scratch.
At the Engineering Faculty some developments are in progress to-
wards this direction [2].

Conclusions

The SiFEUP plays now a fundamental role in the learning process at
FEUP, for students and for teachers, in the classroom or in team-
work, for regular programmes as well as for continuous education.
An important part of its success derives from its integrated nature
that suggests new unexpected connections.

Although a good information system helps a lot in renewing the
pedagogical process, the main issue remains an organizational pro-
blem, from the commitment and leadership of the management to
the redesign of the procedures.

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