How the FEUP Removal to the New Premises Was Facilitated by the Internal Information System

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Abstract: Since 1996 that FEUP possesses an information system (SIFEUP) that was developed mainly to record the information on the school’s activity concerning teaching and learning, research and development as well as for school management.

The system has been built in-house and has nowadays more than 30 integrated modules that are enabling the modernization of many processes and services providing simultaneously decision support facilities.

In this work we will show how this system was a key tool to organise the logistics of the Faculty removal to new premises, namely its importance for minimizing the impact on the users resulting from the change to completely new infrastructures.

Presentation of the Engineering Faculty and its environment

Descending from the Polytechnic Academy, created in 1837, the Faculty of Engineering of the University of Porto (FEUP) is presently a prestigious public institution concerning the teaching and research of Engineering.

The Engineering Faculty is the biggest of all the faculties that belong to the Porto University. It has almost six thousand students, four hundred professors, more than a half with a PhD, and two hundred staff. The University of Porto, is itself the biggest in Portugal, with approximately 25,000 students.

FEUP presents a departmental structure, composed of six areas, Civil Engineering, Chemical Engineering, Electrical Engineering and Computers, Mechanical Engineering and Industrial Management, Mining Engineering, Metallurgical Engineering and Materials. To support the activities of these departments and of the Faculty as a whole there are several central services, including the Computer Centre, the Library, the Academic and Staff, the Economic and Financial, the Continuous Education and Development, the Public Relations and Image and the Technical and Maintenance Support services.

FEUP offers eight undergraduate courses, 23 MSc degree courses and 8 areas for PhD studies, as well as other specialized post-graduate courses.

Besides teaching the FEUP is currently involved in more than a hundred research projects, many of these on an international basis and in co-operation with industry.

Since the year 1937 until September 2000, the Engineering Faculty occupied a location in the centre of the Porto city, with around 30,000 m², where several adapted buildings housed the departments, services and R&D institutes.

On September 2000, the Faculty moved to a new location, in the city periphery. This new location almost triplicates the available area.

The different departments and services occupy 12 main buildings, as shown in Figure 1. The covered area is now about 90,000 m², where lecture rooms and offices occupy each 17,000 m² and laboratories 41,300 m². This was probably the biggest and most complex move that occurred in town for many years.

One of the many aspects of the move that has been particularly demanding was the maintenance of the users connectivity to the network and computing services. Since 1988 the Engineering Faculty possesses a local data network. It has been built as a shared 10Mbps Ethernet network and upgraded to a switched 10Mbps Ethernet technology in 1995. Just before the removal to the new premises the number of nodes connected to this infrastructure was around 2,500. In the new location, the local area network is a completely different infrastructure incorporating ATM OC-12/OC-3 technology, respectively in the core and in the backbone, and offering switched 100BASE-TX to the users, at the access level. If necessary, it can also offer ATM to designated users. The number of active access points is this infrastructure is 6,000 and about 3,500 nodes are presently connected. These nodes comprise central clusters of UNIX/Linux and NT servers, plus several departmental NT and Linux servers, and more than 500 microcomputers in 30 general computer labs. The library has also about 100 desktop computers for the students and

Figure 1. SIFEUP: information about the Faculty map
many others are available at the departmental laboratories. The ratio
student/computer is better than 5. The FEUP LAN, that we call
FEUPNet, is connected to the national scientific communication net-
work (RCTS) by a 2Mbps link.
The Faculty always promoted the use of the computing environ-
ment. All the students are allowed to use the network and comput-
ing resources since the first year of their undergraduate
programmes. They also have full access to the Internet, as well as all
the other elements of the academic community. Almost every pro-
fessor, technician or administrative staff has a personal computer
connected to the FEUPNet. FEUP offers teleworking facilities and
presently near 2000 students and staff use traditional analogue tele-
phone lines and ISDN to connect to the FEUP Access Server and
access the resources available to do remote work.
As the network and its computing and information resources are
used on a daily basis, it was necessary to guarantee the users connec-
tivity to the main services during the removal period and no more
than a 24h interruption was acceptable. Because the removal of the
Faculty was scheduled to occur in less than two months, the connec-
tivity to the network and access to the servers should be available to
the users that were already at the new premises as well as to the
users that were waiting to move, at the old buildings.
We will show in this work that the internal Information System
(SiFEUP) has been a key factor to make the removal of the whole
Faculty feasible in an especially short interval. It helped on minimizing
the impact on the users and permitted the new academic year to
start normally, with just two weeks of delay.
The initiative of creating an integrated campus wide information
system belonged to the faculty direction board, in 1996 [1]. Its
strong commitment with the project was essential to make it possi-
ble, as the different departments and R&D units within FEUP have
large freedom in managing their resources and thus a high level influ-
ence is necessary to push towards the development of such a sys-
tem.
The main goal of the SiFEUP has been to enable faster access and
dissemination of scholar, scientific, technical and other info-resources,
stimulating a stronger collaboration among members of our aca-
demic community. A second, but equally important goal, has been
the possibility to increase the connection and the interaction with
other higher education institutions and with industries, especially in
the northern region of Portugal.
Before the removal, the information system already included
about 30 modules covering aspects ranging from the school infra-
structures and the academic and staff records, to the course plans,
scientific productivity or the external assessment processes [2, 3].

Planning the removal

Logistics
The removal of FEUP did start 18 months ahead with the inventory
of all goods that we need to move. SiFEUP took an extremely impor-
tant role in this task.
During this inventory period SiFEUP databases were fed with in-
formation concerning staff and classroom furniture, lab equipment,
computer and peripherals, and all kind of machines. Special attention
was given to particular equipment where size, weight, fragility or re-
lease date could be relevant to the process. When needed new fields
were added to the SiFEUP databases.
Nearer to the target date, FEUP direction board took the decision
of celebrating three different removal contracts: books and docu-
ments, furniture and computers (special equipments were left to
other kinds of contracts). At this point SiFEUP was again a priceless
tool because, to launch the contracts, a survey of all removable
equipment was needed. Querying the database and producing
printed lists, ordered by type, size or location, to be attached to the
quotations requests was done easily.
Planning the removal has thus been an easier task with SiFEUP.
Clusters were defined straightforwardly so that equipments “belong-
ing” to the same contract, placed at different locations, but with the
same destination building, have been identified and planned to be re-
moved simultaneously.

Providing contact information
The SiFEUP official information on each member of the teaching and
administrative staff includes, since the beginning, his office number,
main and secondary telephone numbers, e-mail address and comple-
mentary home page URL, if there is one. The first two items of this
contact information are kept by the Staff Service, and the last three
items by the staff member himself. It was enough to provide updated
phone or e-mail directories and to help on finding someone, until the
removal planning started. At that moment new requirements be-
came priority: more than one room should be allowed for each per-
son, and a way of publishing the blueprints of the new buildings
should be found.
Actually, it was convenient to record the assignments of staff to
the rooms in the new premises as soon as the decisions were taken,
so mistakes could be easily spotted and the whole process become
widely known and transparent. The old rooms were still active for a
few months. Fortunately, the underlying database design already sup-
ported more than one room associated to each person, so a small
adjustment of the user interface accomplished the task.
To fulfil the second requirement a new module has been devel-
oped which, instead of just collecting the scanned version of the ar-
chitect’s blueprints, provides an interactive image of the blueprint
of each floor of each building. Clicking on a room highlights it and dis-
plays its characteristics - identification, usage, area, number of in-
tended occupants, equipment, network access points, telephone
numbers. This tool proved very useful in several respects: it satisfied
the natural curiosity of everyone about the details of the new build-
ings and improved the motivation to prepare the removal; it dissemi-
nated the nomenclature of the new spaces, overcoming divergences
between different versions of printed blueprints; it helped the staff
to choose the rooms among the proposed alternatives and to ex-
lore the future environment. As soon as someone got assigned to a
room, contacting him became an easy task because a link to the rele-
vant blueprint was automatically added to his official home page, as
well as a link to each occupant was added to the room. The assign-
ement of each new telephone number to a person has been automati-
cally crosschecked with the possible numbers in the corresponding
room, highlighting mistakes and incoherence of the installing com-
pany.
Another communication facility of SiFEUP that proved very handy
during the whole process has been the dynamic mail [2]. This is an
implicit distribution list management system that enables anyone to
send a message to a group of persons selected according to a set of
characteristics specified at run time in a query form. For example, it
is possible to select all the members of a department, all the full pro-
fessors of the faculty, everybody called Carlos, all the students in a
certain course, etc., and send a message to the e-mail addresses they
have recorded in their own information. The ability to straightfor-
wardly target messages to specific audiences helped on the coordina-
tion of the process allowing to reach the intended readers without
disturbing everybody else. The turnaround delay of printed commun-
ications was not compatible with the response time required by the
short overall duration determined for the removal process and the
frequent rescheduling required by the optimisation of the involved resources.

Availability of network and computing resources

As said before, all the users of the FEUP academic community use
the network and its resources on a daily basis. The professors,
among other utilizations, use the network to prepare their classes,
to provide contents to help their students learning, to consult infor-
mation about the students and courses performance, to communi-
cate both with the students and colleagues and to run their
applications. The administrative staff uses the SiFEUP intensively. As
the information system is installed on servers on the scientific net-
work, FEUPNet, they must have permanent access to it. Besides
FEUPNet, they use the administrative network to create and modify
the students and staff records, on the corresponding databases. The
information in these databases is imported to the SiFEUP to make it
available for all the academic community. The Library has its cata-
logue available on-line. Users may apply for a book or request an arti-
cle using facilities associated with the OPAC. The resources the
Computer Centre offers are available through the network. In gener-
al, all the Faculty Central Services use the FEUPNet for their work.
Similarly the students use the FEUPNet to register for classes, to vi-
sualize their schedules, to access the information and resources
about their disciplines, to communicate with the professors and with
each other, to ask for certificates, to access the OPAC, to do their
class work and programming and to access the intranet and Internet
resources.

It was thus a fundamental goal to create conditions to maintain
the accessibility of the network high for all the users during the move
of the Faculty to the new location.

The Computer Centre accompanied the installation of the passive
and active infrastructures of the new FEUPNet. It provided the instal-
er information to configure all the switches at the four levels, core,
backbone, distribution and access, as well as the three core routers.
Private IPv4 addresses were used all over and about 50 virtual LANs
were created on campus. ATM addressing was also configured.

In order to prepare the move, the Computer Centre used the Si-
FEUP to provide all the information concerning the configuration of
a network node in each room of the new buildings (see Figure 2).
For each room and for each access point ("Tomada" on Figure 2),
the IP address, the gateway and a temporary logical name for the
node was provided. Information about the DNS primary and second-
ary servers as well as for the VINS servers was also displayed, to-
gether with the subnet mask and the domain name fe.up.pt. Fixing a
logical name for the nodes at the new premises, although just on a
temporary basis, has been necessary to maintain all the network ser-
ices in both the old place and the new one. The two places were
connected by a 1Mbps-dedicated link.

![Figure 2 SiFEUP network information](image)

Using this information, most of the users were able to configure
their PCs themselves when they have moved to the new rooms. The
support of the Computer Centre technical staff to this task was kept
at a practical level. The configuration of nodes in the computer la-
boratories has been done the same way. At the old place, users
maintained their connectivity to all services without the need to alter
the PCs configuration.

The above methodology has been previously explained to all the
academic community using the SiFEUP dynamic mail [2] facility, which
allowed tailoring the explanations in accordance with the users group
profile.

This way only when the Computer Centre moved the central ser-
vers to the new location the users were not able to access the net-
work. This was done in 12h. Half a day was thus the interruption
period that users suffered in spite of the complex process of such a
move.

Later on, when most users were already at the new location and
using the network, the SiFEUP was brought into play again to create
an interactive facility for the users to choose the definitive DNS
name of their nodes in the new network. Again associated with each
room’s page, a “Change” (Alterar) button allows the user to suggest
the logical name for the node associated with each IP address. To do
this, the user must identify himself and the system verifies whether
he is an authorized user for the corresponding room. After the Com-
puter Centre has validated the suggested logical name, it is intro-
duced in the DNS database and the user receives acknowledge by
mail. As the system automatically records the user of the request,
the Computer Centre may also contact him to resolve some possible
DNS name conflict.

The installation

Several tasks related to the installation phase in the new building
profitted from the help of SiFEUP, as shown in this section.

Sizing the acquisitions and maintenance contracts

Specific data related with different rooms such as dimensions, ca-
cacity or usage was introduced in SiFEUP enabling, at the final stage, to
define quantities of furniture to buy for classrooms and professor or
staff offices. In addition sanitary fittings like hand dryers, toilet paper
to or soap dispensers have been quantified with the help of SiFEUP.

Signalling of offices, laboratories, classrooms and buildings was also
done making use of information supplied by SiFEUP.
Launching of cleaning or security contracts was again based on data supplied by SIFEUP. It helped to know quantities of toilets and square meters of offices and corridors or to define day and night rounds for the watchmen and the best placement for video cameras.

Start-up of the new academic year

Moving to the new premises was not just a matter of transporting assets and reproducing the old routines. The dramatic change in the facilities induced the setup of new procedures plainly not feasible in the old conditions or that the management decided to implement profiting from the dynamic of the whole process. This required an extra effort from the SIFEUP team and at the same time increased the role of the system in new areas.

Before, class timetables were the responsibility of each course director who had a set of classrooms to manage, with the inherent waste of resources. Currently, the course director is still providing the first draft of the timetable but the actual classrooms are centrally assigned using a single database and its usage is thus globally optimised. A similar procedure is adopted to schedule the examinations among the available examination rooms.

The same room database is used to support the Web-based booking of rooms for specific events like conferences, special examinations, meetings, etc. The size of the facilities and the number of events justify the need for the automation of this process. The actual booking requires confirmation but the request is not even issued if the room is not free and that can be checked in SIFEUP beforehand. The same Resource Booking Module is used to reserve equipment like video projectors, laptops, special printers, etc., but the policy here does not require confirmation before becoming effective.

A last example of using the SIFEUP in an unforeseen way is the Parking Card Module. Two weeks after the classes had started, it became clear that some discipline had to be imposed in the parking areas and that process required a parking card to be issued to each student. Readily, a Web form has been prepared that each student needing a parking card had to fill in, after authentication by the SIFEUP, in order to obtain the corresponding card number. This way, a lengthy registration process has been avoided and the whole data was consolidated.

Conclusions

The SIFEUP had a fundamental role in the removal of FEUP to the new premises. To plan the removal, several activities were carried out. The IS helped mainly on recording the Faculty patrimony associated to the respective rooms. This allowed an easy crosscheck with the persons in charge and was the base for calculating the required resources and for scheduling the whole operation.

Simultaneously, the availability in the IS of the new buildings drawings, identifying the type of each room, its capacity, and assignment to department or service, helped to organise the redistribution of the staff and the delivery of the removal boxes.

Another fundamental role was the access to the information concerning the computer network, which minimised the impact on the users resulting from the change to a completely new infrastructure. Associated with the page of each room the information on how to configure a PC on the new network was given and thus most of the users were able to do this task by themselves. A minimum support from the Computer Centre technical staff was needed. Besides this same page provides an interactive facility for users, once at the new location, to request definitive DNS names for their computers. The performance of this Computer Centre service was thus significantly improved.

The communication function of the IS was identically relevant for other aspects of the installation in the new spaces, namely on providing contact information for staff and room locations for students. Even the semester timetables were readily built with the help of the system.

The SIFEUP does already play an important role in the daily work of the Faculty, inducing new practices and facilitating processes. However new modules are under development so that SIFEUP may widen its influence enabling, for example, our staff to perform efficient preventive maintenance to the installations.

Bibliography