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New technologies applied in the educational process in the TEI of Athens. The case of "e-education" platform and electronic examination of students. Results.

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Abstract: - The goal of this paper is to give an overview of the introduction of new technologies in the educational process of the Technological Educational Institution (TEI) of Athens. Two applications have been developed an implemented in parallel. The first one is a web platform focused on the publication and management of modules material in electronic format. The second one is an electronic examination tool for student evaluation. Features, advantages and results from their usage are presented.

Key-Words: - e-education, e-examination, new technologies, methodologies in education.

1 Introduction

Today it is widely accepted that new technologies can radically alter the educational practices and enhance the learning procedures [1]. Additionally, their incorporation in the academic practice is a key element of modern educational process [2,3]. Efforts have been initiated several years ago for the introduction of new technologies in education. The initial efforts, made on asynchronous education, did not succeed, mainly because the academic community was not "mature" enough to adopt supportive methods to the educational process. People were not accustomed to technology, the size and cost of computers was too high to handle and the software produced was, in many cases, not user-friendly [4,5]. Nevertheless, this process of incorporation concerning academic institutions nowadays keeps growing and is still in the beginning, since today computer technology is accessible from anyone. International experience shows significant differences to the attempts made from country to country, which also vary in every discipline [6]. Today, with the use of new educational tools a number of problems are solved gradually, especially problems that have to do with the lack of appropriate educational software, the further training of teachers, the readjustment of courses to the new conditions and the hardware infrastructure [7,8].

In the TEI of Athens, two kinds of applications have been developed and implemented. The first one is a web platform named "e-education" which is an integrated system for storing, managing and presenting digital support material [9,10,11]. The second one is an application of electronic evaluation of students which can also be used as a self-evaluation tool [12,13]. These applications have been tested and comparative studies showed that both of them are applicable in the educational environment of the TEI of Athens. The results are presented in the following sections.

2 New technologies applied in the educational process in the TEI of Athens

2.1"E-education" platform

The "e-education" platform is based on the e-class platform, developed by GUNET [14]. E-class was based on the Claroline system [15]

which is an open source software package. E-class was adopted and properly customized to reinforce and support current educational activities in the academic community of the TEI of Athens. The system provides teachers with certain tools for managing modules content easily and efficiently [16]. Until few years ago, the management of electronic educational material was mainly based on teachers' personal motivation and effort, but was not coordinated by an official authority of the TEI of Athens. A central website was online containing information about courses and links to websites of schools and departments. Teachers' personal web pages were hosted in the department websites. Through these pages, students had access to study material. The maintenance and update of the web pages was each teacher's responsibility and was based on personal knowledge and inspiration. This means that in most cases there was no technical support by a specialized team and there was complete absence of a specific template concerning the structure and organization of the educational material. Lack of uniformity made the search and access of information difficult and complicated, leading students to abandon trying.

"E-education" is an integrated system for storing, managing and presenting digital educational material. In particular, the elements which compose a digital module and can be created / managed by the teacher are:

- Files which include the study material of the module (text documents, slides, videos etc)
- Discussion forums for exchanging opinions and ideas on matters related to the module
- Student workgroups focused on special projects
- Storage points where the students can upload their projects
- Internet links related to the module
- Announcements concerning the module
- A calendar which presents in chronological order the module key events (lecture meetings, exam dates, etc)
- Module description with extensive information about its outline
- List of registered students

Many of the above mentioned features are shown in figure 1.

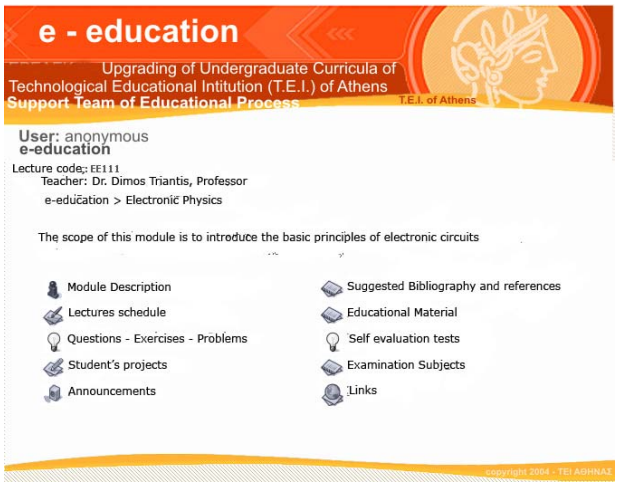

Fig1: "E-education platform", main menu.

2.2 "Electronic Examination"

The second application developed in the TEI of Athens is the electronic examination of students. It is designed to provide two services. It can be used either as a tool for students' examination by substituting –optionally- the traditional written method or as a self-evaluation tool.

A student which is taking the electronic test has to answer a series of questions through a user-friendly interface. E-examination tests consist of four categories of questions:

- True or false
- Multiple choice
- Questions that demand short calculations. In this case, students must type the answer in the corresponding field
- Problems or exercises that require multiple steps for their solution. These steps include questions which belong to the previous categories.

The e-examination application has been designed to provide a user-friendly environment which incorporates an online help system about the examination procedure (i.e. how a student can logon to the system, navigate through the questions, etc).

The screen of the user interface is divided in two main areas. The wider one displays the

question and the possible answers along with the navigation panel. The second one displays real time information about the test. This information includes the remaining time for the completion of the test, current question number, total number of questions of the test and the module chapter the current question refers to. Figure 2 shows a sample screen of a multiple choice question.

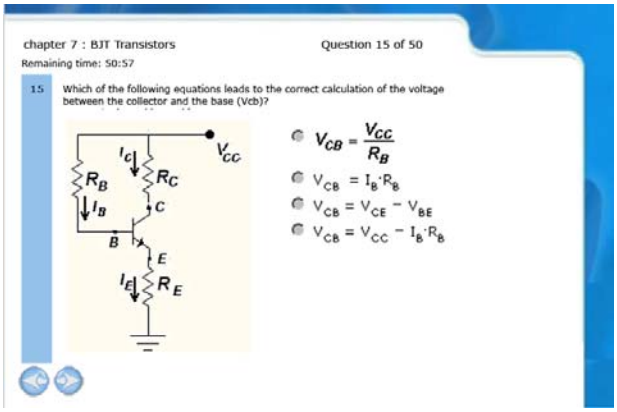

Fig.2: A sample multiple choice question of the electronic examination

Before submitting the answer for the final process, the student can navigate back and forth in order to perform a last check. This option enables students to review their answers and alter them or even fill in any unanswered questions.

3 Results - Discussion

"E-education" platform is a helpful tool in the hands of both teachers and students. It acts supportively in order to aid the educational process, operating as a digital library and a free, instant information provider. The user-friendly administration and management tools and the presence of a technical support group help any interested teacher to create the module related web pages easily, without being concerned about technical matters. They only have to focus on the formulation of the content.

Teachers can manage and alter the digital content from any PC which has access to the Internet. This way, the material can be available to students instantly and always up to date. So, the time-consuming procedure of printing and distributing documents is avoided. Communication and exchange of views with students becomes easier via the platform either by e-mails or through discussion forums. Teacher can also post announcements related to modules in no time. Finally, project delivery from the students can be done 24 hours a day, 7 days a week.

Students, on the other hand, can perform literature research easier and quicker, since the material and relative bibliography is organized and concentrated in a specific point from a "specialist", who in the case of "e-education" is each module's tutor. The existence of template uniformity eliminates any confusion concerning navigation and browsing. Students can find not only material which corresponds to modules, but also topics on various scientific and research fields that may interest them. This means that module web pages can be used as a starting point for further search on related topics. The quality and certification of the educational material is guaranteed as it is checked and distributed by authorized and skilled personnel [17]. Any PC connected to the Internet can provide access to the educational material inside or outside the campus. This offers essential help to students' homework. Finally, any information concerning module agenda, projects offered and announcements is always available.

While "e-education" is the tool that supports the educational process, the application of electronic examination is the tool for the evaluation of acquired knowledge. The use of new technologies can automate many steps of the examination procedure saving time and trouble. The correction and marking of tests are processed automatically by the system and the extraction of results is instant. The results and all examination data such as examinee's final grades, time elapsed for the completion of the test, etc., can be recorded in a database for storing and statistical processing. This way, no time for correcting papers is wasted and the risk of losing a paper is eliminated. The overall cost and time needed for the production of hard copies is also minimized. Finally, polymorphic material (images, sound, and video) can be introduced during the examination.

From the students' point of view [12,18,19], the main advantage they gain from the use of the application, either as final examination or as self evaluation tool, is the immediacy concerning the marking and the elimination of the stress while waiting for the announcement of the final results. Evaluation tests produced by the electronic examination application can be found on the "e-education" platform. Students can download and use them for self-evaluation purposes. This way, they have access to a tool for estimating their level of acquired knowledge and a simulation tool for the official electronic examination process which takes place in the institution.

4 Conclusions

For the first time in the TEI of Athens, a coordinated and essential effort has been made in order to incorporate new technologies in the educational process. Unlike previous efforts which failed to stimulate the interest of the academic community in the institution, this time feedback from students and teachers is positive and encouraging. The module of informatics which is taught in the secondary level of education and the use of computers in everyday life creates a suitable background to students for adopting the newly introduced tools.

The "e-education" platform is currently online and available to all TEI educational staff. Since the whole process is at an early stage, not all modules of the courses offered in the TEI of Athens have digital material online. Nevertheless, many teachers have expressed their interest after several meetings that were scheduled for demonstrating the new tools and services offered by the platform. They are in the process of creating study material in electronic format for their modules and are expected to prepare and upload it in few months time. A technical team was also formed and staffed by an IT group in order to consult and offer assistance to people who wish to use the platform.

Concerning the electronic examination application, teachers that have performed that kind of students' evaluation, express their satisfaction with the application and the features provided. The user-friendly environment and the ease of use of the electronic examination application, in combination with the variety of the questions provided, according to students' statements help them perform better. The first pilot operation of electronic examination took place in June 2004 and the outcome was very encouraging. Students who participated in that process performed quite well. Suggestively, 68% of the students who were evaluated electronically passed the module and 16% of them had excellent performance (grade>=7.5/10), while 47% of those who were examined conventionally passed the module and 9% of them achieved excellent performance (grade>=7.5/10).

Conclusively, every innovation, in the field of education attracts students' interest [12,13]. This is why they must be encouraged to develop initiative and pursue knowledge, rather than merely react and absorb. The right pace has to be found for the achievement of the best possible results for education. Those results will require an intense focus on the substance of what the new technology can deliver, as much as on the process. We will still need libraries, seminars and tutorials, faculty, books, laboratories and residential environments. The role of new technologies is not to replace or even degrade the traditional forms of teaching, but to strengthen what already exists, and also extend our capacities. This results to the accomplishment of higher percentage of knowledge assimilation and better efficiency during the teaching process.

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