An E-Learning Project for a Basic Mathematics Course at the University

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INTRODUCTION

This article provides an evaluation of the impact of a specific e-learning platform (www.blackboard.com) upon pass rates, in particular on the MidTerm tests pass rate of "Calculus I", a math course held at the Catholic University of Milan.

An ICT project for a basic math course was developed and introduced in 2001 at the Catholic University, Faculty of Economics. Designed for freshmen, the course currently involves as many as 1,200 students, which is quite an achievement when compared with other e-learning blended courses available at the same university. The chief objective of the course is to supplement face-to-face lessons with the online learning activities implemented inside and/or outside the traditional classroom. The innovation of this project consists not only in its technological features but also in its tracking facilities. In fact, student online activities can be tracked down and teachers are provided with continuous feedback for the same to be redesigned. In addition, students can widen their knowledge of the subject matter through additional learning materials such as interactive self-assessment tests, guided assignments, and so forth.

The course is based on four macro-areas: an information area, a content area, a grading area, and a student-to-teacher communication area.

Thanks to Blackboard tracking facilities it was possible to include in this article details on the most visited areas by students. The results of a survey conducted about students' satisfaction rating of Blackboard are also reported.

It is noteworthy to point out that the results are quite encouraging and a close correlation between "online active" students and their pass rate exists: as a matter of fact, evidence was found that students access rates and pass rates on MidTerm tests are related.

BACKGROUND

The advent of multimedia and Web technology has become the major focus of activities at the university, which is usually considered the place of excellence in terms of cultural as well as experimental trials. More specifically, the potential that these tools provide as options to improve and supplement the traditional teaching methodologies have been amply debated. Maybe, this is the result of the tremendous need for compliance to European productive standards.

In effect, if the ratio between the number of graduates and the number of university students can be regarded as a significant indicator of the university's productivity, Italy is performing poorly compared with its European counterparts. Approximately 38% of Italian students achieve a university degree after an academic career—on average—longer than that of their foreign peers.

Such a low performance of Italian universities can be undoubtedly upgraded by mixing emerging teaching patterns with traditional methods. In so doing, modern technologies can be exploited efficiently and can lead to the prevalence of new teaching styles and techniques. In Italy distance university courses are growing incredibly fast and most universities provide courses, either entirely or partially, on line. The latter are so called because they combine traditional with distance learning. According to a survey carried out by the Italian Association of Electronic Publishers (ANEE) in 2005, approximately 85% of Italian faculties were found to be delivering online courses.

These findings provide the framework for the ICT e-learning project course.

DESCRIPTION OF THE PROJECT

Calculus I is a Math basic course compulsory for some 1,200 students in the first year of a three-year degree at the Faculty of Economics of the Catholic University of Milan. As a matter of fact, a growing number of students from secondary schools face problems in understanding the course content because of their poor knowledge of the subject matter. It is a well-known fact that the relevant math exam represents a major obstacle for the students of this faculty and has not only the highest failure rate, but many dropouts and considerable delays in completing the university degree.

The Calculus I project course utilizes Web-based functions provided by a learning management system—Blackboard (Bb)—(http://blackboard.unicatt.it) that has been selected after a careful evaluation of the most popular course management platforms available. Access to the online course is granted with a password which is reserved for students enrolled in the official university course. The course is subdivided into six parallel sections because of the high number—nearly 1,200—of participants, and this subdivision is maintained in the online course, with the exception of some shared areas that serve to encourage collaboration between the groups of students and optimize teaching collaborative activities.

The course allows for either synchronous teaching—provided by the teacher mostly through a variety of media—or asynchronous teaching, in discussion forums where flexibility in terms of access time is guaranteed. Instructors, with the help of assistants, manage the online course on Bb, by making available to the students charts, material, and relevant documentation prepared by the teaching staff. In addition, virtual classroom facilities, group tests, self-assessment tests, and so forth, are also utilized.

This platform gives the instructors the possibility of monitoring the performance of their students in real time through extremely accurate access data—time of the day, day of the week, performance rates; a notable advantage over other learning management systems.

Each of the four macroareas identified within the math course on Bb, namely Information area, Content area, Grading area, and Communication area, corresponds to menu links in the left-hand column of the course home page (Figure 1).

On entry the course is displayed as is shown.

Table 1 shows the location of the areas in the menu.

Announcements. This is where course-related and other announcements are posted, including exam results, extra lessons, and newly published materials.

Figure 1. Course entry point