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**VIRTUAL CAMPUS VERSUS REAL CAMPUS:
A REFLECTION ON THE PROCESS OF TEACHING AND LEARNING**

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An important tool for teaching is used at University of Alicante: the virtual campus. We think that information and communication technologies can help us to improve our teaching. Last year, we prepared some materials for our students and checked whether these materials were useful for them. Our experience tells us that students have great difficulties in applying concepts of physics to problems and to treat experimental data. Therefore, the materials have been prepared in support of these aspects. In this study we have also analyzed the difficulties of the students in using this tool and proposed some solutions. Finally, we checked the knowledge acquired in the physics laboratory by the students by monitoring them for fourteen weeks.

Introduction

Among the topics which will be mentioned at the formatex meeting on the 20th of November will be the possible role of virtual campus in education. In the case of the University of Alicante, teachers have been using this tool for some years. An important question to answer in education is *why students spend a lot of years studying some subjects?*. In fact, the Polytechnic University College has done a study about how many years they take to finish a three-year degree in Architecture. The result of this investigation was an average of seven years!

Therefore, as a first step we have analyzed the behavior of students in the first course of five and three-year degree in Architecture in two cases:

1. A small group of around twenty-five students, where we could monitor each one individually.
2. All students in general in order to check their participation in the virtual campus

Although there may be differences between them, both laboratory and theoretical classes were very similar. Therefore, we have elaborated and recommended the use of the same materials for them.

In this paper, we present and discuss mainly the response of the students and then we make our solutions and conclusions to improve the learning support to the students.

Virtual Campus: the data

In this study we have assumed some conditions of work by the students which can be summarized as follows:

1. All of them may use a computer at University or at home to get the material proposed.
2. They have a background knowledge of information technology tools, for instance:
 - a. internet
 - b. to install free packages
 - c. to compress and to decompress archives
 - d. to send e-mails
3. Tendency to learn or to improve new tools.
4. Tendency to tell us the problems they found.

As mentioned above, we have been working with the virtual campus at the University of Alicante and all of our students used it during the last course. First of all, we will describe material which was elaborated by the teachers:

Summary of all subjects that we will explain during the course.

Solution of problems proposed to solve.

Solution of exams realized.

Notes and applications of error analysis.

Then, we present two different graphs to illustrate how many students have used this tool: figure 1 shows the absolute number of times the material was used by three-year degree students and figure 2 shows the same thing by five-year degree students.

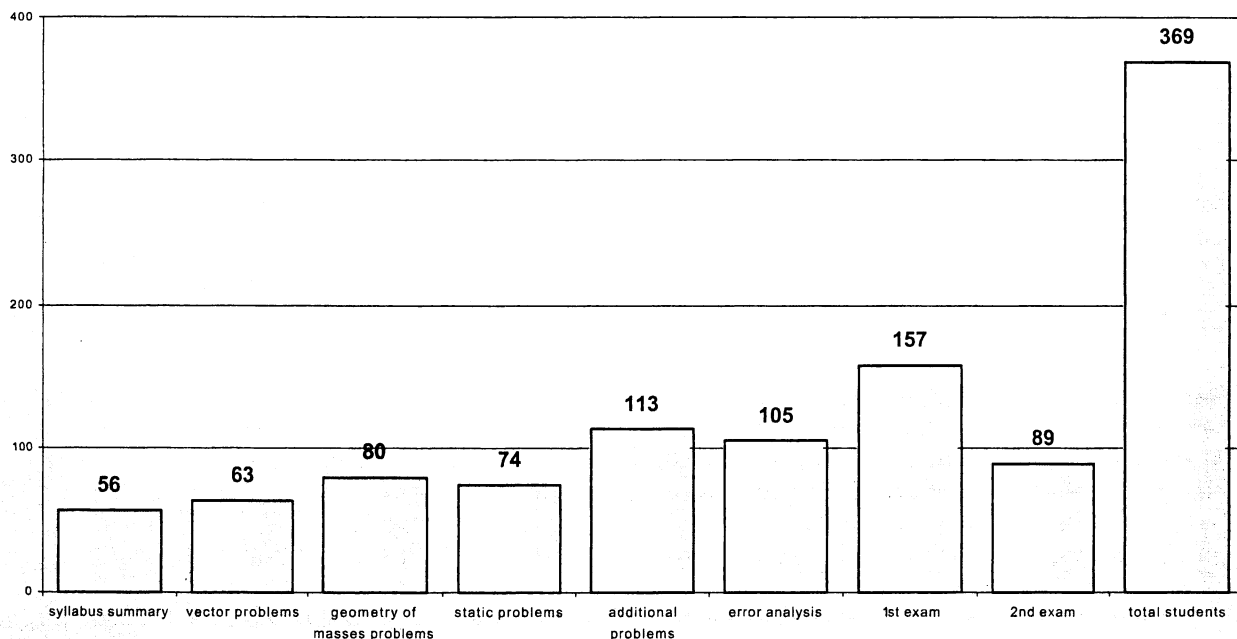


Figure 4. Number of three-year degree students that have downloaded archives using the virtual campus.

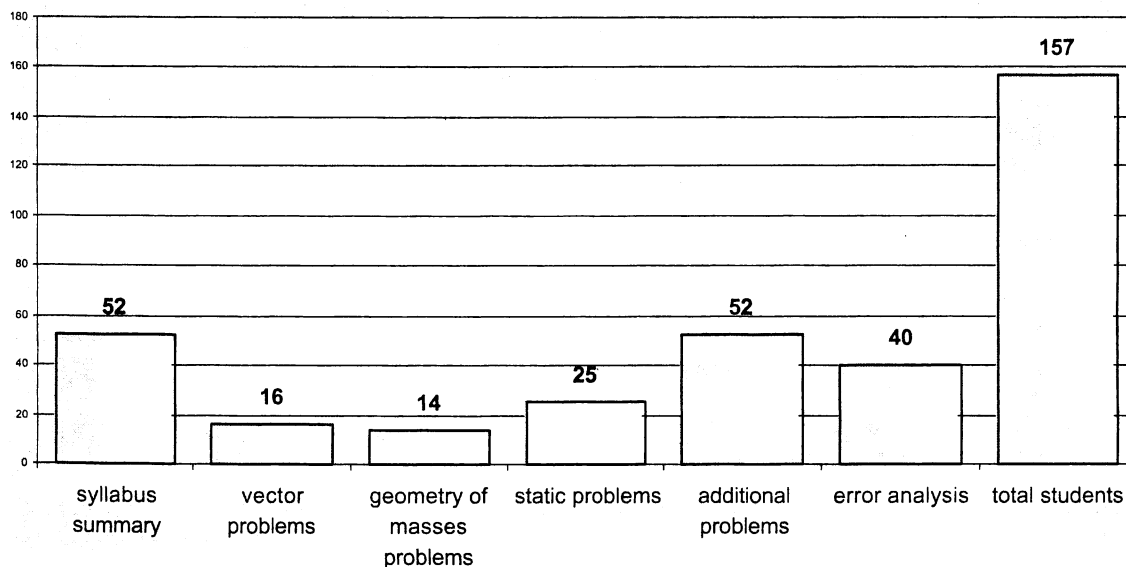


Figure 2. Number of five-year degree students that have downloaded archives using the virtual campus.

Although the next diagram may contain the same information, we have thought it would prove useful to present the percentage which will be a parameter to discuss the participation of the students in this tool.

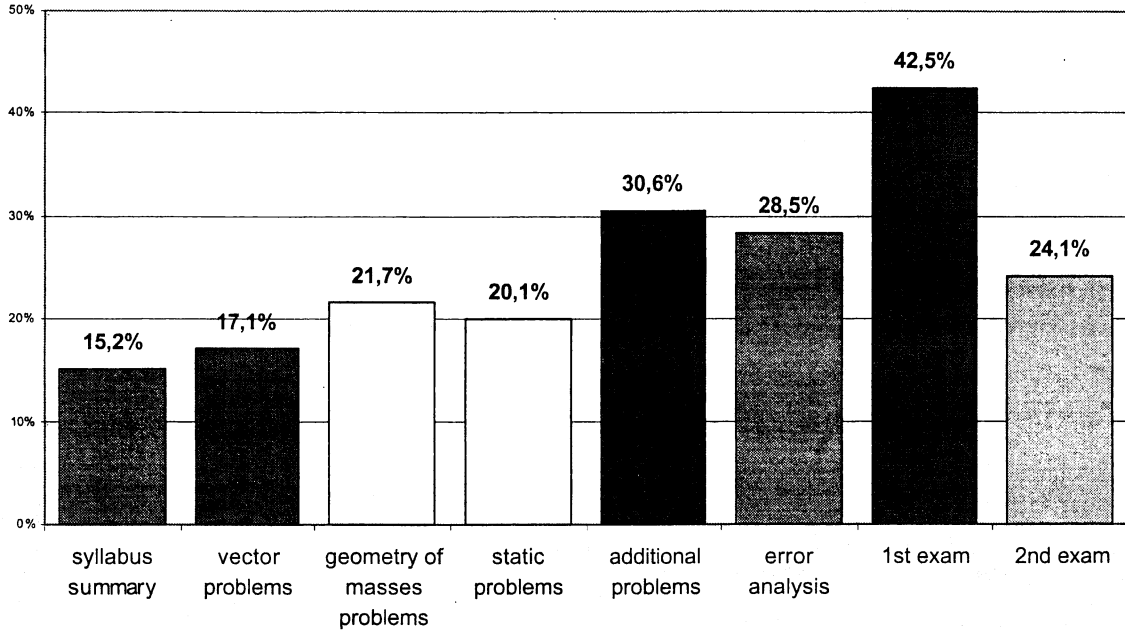


Figure 3. Percentage of three-year degree students that have downloaded archives using the virtual campus.

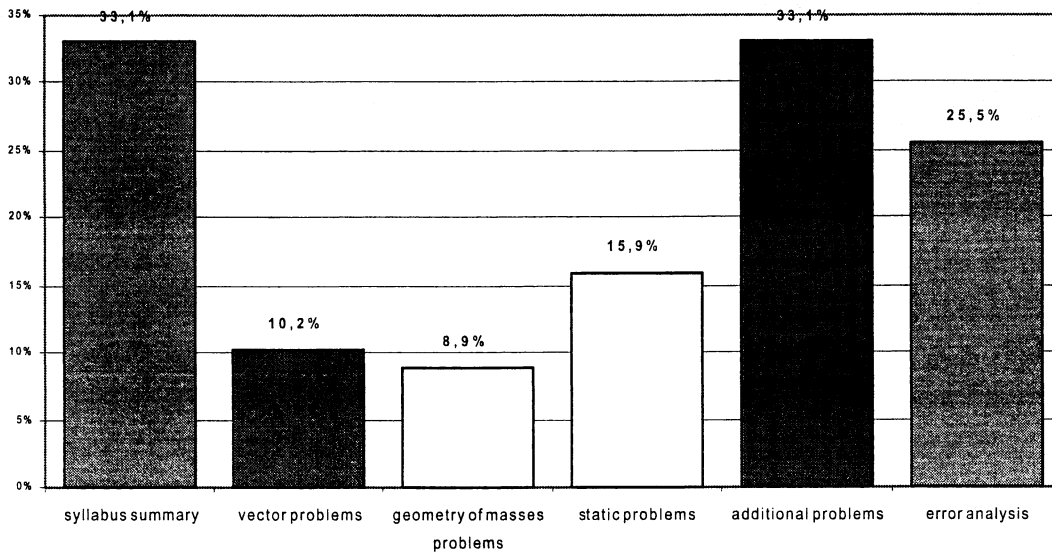


Figure 4. Percentage of five-year degree students that have downloaded archives using the virtual campus.

Real Campus: the data

In this section we present the data we have obtained in monitoring the students for fourteen weeks. The method is based both on laboratory work done by students and continuous teacher support. During our monitoring we have studied some experimental aspects summarized as follows:

- To estimate errors of indirect measures in the laboratory.
- To express measures and errors correctly.
- To understand the relationship between experimental data and the law of physics.
- To physically interpret the results obtained correctly.

Methodology

The aim was to analyze our monitoring which principle characteristics were:

Students have a guideline of each experiment and a limited time of two hours to do it.

The experimental work in the laboratory is revised and corrected one by one the following week.

Teacher support is realized both in the laboratory and at the office.

At the end of the fourteen weeks students must do a test exercise the purpose of which is to evaluate their learning process.

Thus, we have been working with our students directly on the aims of the experience. This interaction with them allows us to know whether or not they manage to learn the experimental aspects pointed out previously.

Test results

To check their training period we proposed a test which had twenty questions with five possible answers but only one right one. Thus, in this subsection are summarized the results obtained in each question by all students.

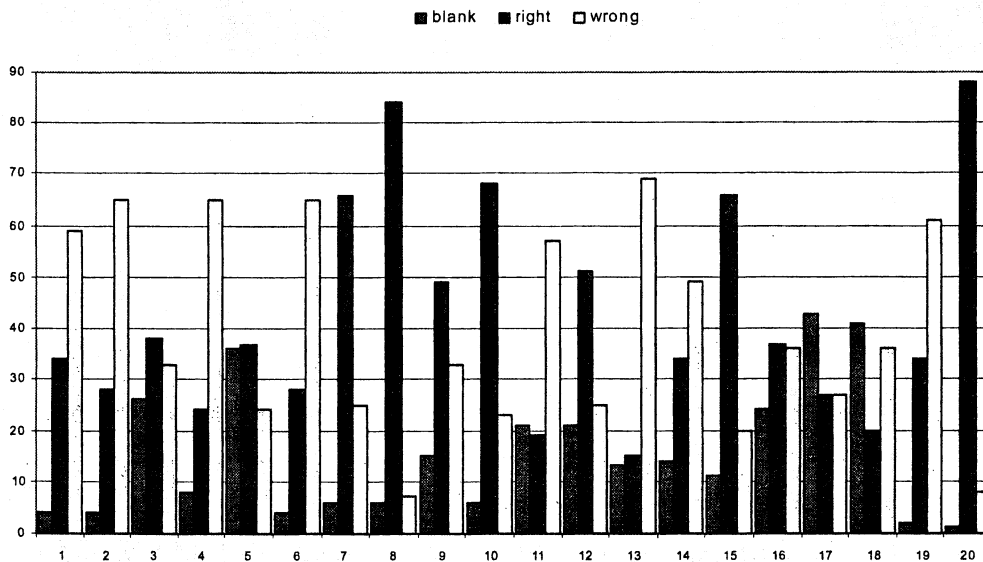


Figure 5. Comparison between blank, right and wrong answers done by students in this test. Ninety-seven students have participated in this investigation.

We have also calculated the marks obtained by them which will be another parameter to discuss in section 4. As we can see in table 1, the marks obtained by both three-year degree and five-year degree students are very similar. Therefore, we can discuss this result as if it were the same kind of students.

However, it was unexpected that nearly 50%! of students have failed the test with a mark less than three. It is possible that other factors have had a negative influence in test response, as for instance the little importance of the laboratory in the final mark.

Table 1. Marks of the test.

Interval	Three-year degree	Five-year degree	Total
[0, 3[19	29	48
[3, 5[12	17	29
[5, 7[9	10	19
[7, 10]	1	0	1
Total	41	56	97

Discussion and conclusions

We think our results are representative of the Architecture students, however the results may be very different for other scientific degrees. Actually, the results obtained reflect an unsatisfactory use of both campuses, virtual and real. Although our methodology that we have used is not suitable for all degrees or subjects, we can give some common situations, as may be the following:

low percentage of use of the material proposed,

great difficulties to use basic information technology tools,

probably, they have to improve their individual work,

weak background in both physics and mathematics (acquired at high school).

Of course we have an obligation to reduce the problems mentioned above, so we must guide and support all students to improve their general background. Therefore, we have been studying and analyzing these factors to obtain some proposals and to apply them at the start of the academic year: stress on virtual campus, on individual work and studying at home and use their first month to improve physics and mathematics background.

As it can be observed in figure 5, there are eight questions in which over fifty per cent of students gave the wrong answer. All of these questions referred to problems which were dealt with during our fourteen week monitoring in the laboratory. This is unusual and too difficult to explain, nevertheless a possible reason for this unsatisfactory result might be found when looking at their timetable. Moreover it is possible that students of Architecture give a high priority to other subjects which are needed to obtain their degree.

To conclude, we think that both the virtual campus and the real campus are useful learning tools for our students. Moreover it provides the teachers with insight in the difficulties the students encounter with certain subject matter. Both are good ways to improve the quality of the educative system and as a result our task for the future will be to complete the facilities of the virtual campus and continue with the monitoring of our students.

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