

IMPROVING STUDENT LEARNING USING STATE OF THE ART IT EQUIPMENT

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ABSTRACT

Fast growth of computer related technology both in software-hardware and application areas, brings new challenges to be faced when using computers for supporting education. In this paper some experiences and the results of a survey are presented in teaching computer topics using computer as a teaching tool. Our teaching activities are related to both computer engineering and vocational school computer programming students and also to students from different areas like marketing, foreign trade, etc. The students in the second category learn computers as a tool for their daily work, whereas students of the first group learn computers as part of their professional education. Although the students come from different departments, there are many common pedagogical problems. In this paper, relationships between the efficiency of learning and the ownership of personal computers have been investigated. For this purpose, we conducted a survey on the students of Yasar University and evaluated the results together with their exam grades. The outcomes are presented and some conclusions are drawn, which concern the influence of computer ownership and usage patterns on the learning curve of students.

Keywords: Education, information technology, digital campus.

INTRODUCTION

Nowadays learning without using modern IT equipment is very difficult in many teaching environments. Although computers play an important role in most educational programs, effective integration requires a good understanding of usage patterns and trends. There are numerous studies published on improving students' learning by utilizing IT technology. These works have different approaches but the main goal remains the same; to gain the maximum benefits from the use of modern technology. The coverage of these works go from collaborative work using IT equipment (Francescato et al., 2007), across using computer games for learning (Isomoto, 2006), up to comparing the effect of different cultural backgrounds of the students for learning (Zualkernan et al., 2006) or the role of ownership of computers (Schmitt et al., 2006).

Not only in higher education, but also in primary and secondary education, computer labs are used extensively in many institutions. Normally these labs are used for teaching information technology, but also for teaching the other subjects using information technology. The layout design is an important factor for effective usage of computer labs. We present some experiences on this matter below.

This paper aims to discuss the suitability of teaching environments and to determine students' computer usage patterns. Computer ownership and usage patterns are considered to be important factors. The results of a survey which we have conducted at Yasar University are presented. The survey mainly addresses to the usage intensities of information technology tools for learning IT related concepts.

DIGITAL CAMPUSES

The concept of digital campus is not a new one. Almost a decade ago, a few leading American universities initiated this idea and soon it became a popular theme among technology oriented educational institutions. Today, most of the universities in the world have their self-designed "digital-campus" oriented web portals. These portals have been providing significant improvements in communication methods, account maintenance, online course management, e-mail applications, electronic calendar application, applications of administrative information systems and support. Traditional ways of going to libraries labs have been significantly diminished if not vanished. Students sitting at a quite and peaceful corner of the university, with a laptop or PAD, can do their class work, perform research, surf internet or check their e-mails.

Digital campuses brought several benefits which include more cost-effective and efficient communication methods, increased revenue through improved recruitment and retention, improved customer service satisfaction and the easier integration of technology into the teaching and learning process. Though these reduced costs can be significant, the real saving is the decrease in the amount of faculty and staff resources spent performing mundane administrative tasks. This decrease allows them to spend more time interfacing with students, doing research, and working to enhance the portal's learning environment, no doubt students are getting the most of benefits.

It is pretty unfortunate that Turkey is left well behind the developments involving digital campuses. Not because of the lack of technologies, but because of the lack of will and proper "mentality". Overall costs and relatively higher numbers of students also are important factors that prevent large scale introduction of digital campus facilities in a country like Turkey. Cost effective strategies based on domestic hardware and software products should be developed and supported by governments and other responsible bodies. Excessive investment on technologies which become obsolete in a few years is not a rational choice which may even be counter productive.

THE IMPORTANCE OF LAB DESIGN

Yasar University has a number of computer labs in different sizes with different equipment used to teach information technology related courses. Pictures from three labs are given below.



Picture 1



Picture 2



Picture 3

It can be observed that the labs of Yasar University don't have a unique design. Here we want to distinguish between classical design, where the teacher is in front of the class and the workplaces are placed as parallel lines (Pic. 1), the U-design, where the workplaces form the letter U and the teacher is in the middle (Pic.2) and another form of row design (Pic. 3).The benefits of the cluster design, where workplaces form independent groupings are discussed in Hanssen et.al, 2006. All these forms have their advantages and disadvantages.

One of the main concerns of a teacher/instructor in the lab is to have maximum contact time with students, so that everyone can get proper and equal consideration .Experience tells that, in a lab environment, lesser numbers of students with lesser numbers of instruction hours can work and learn much better than higher numbers of students with higher numbers of hours. For example, ten students, in one hour may learn more than forty students in four hours. The cluster design appear to be superior to the others especially with smaller sized classes. Despite these and similar arguments, university administrations tend to reject cluster design and go on forming new labs with same old fashioned classic row deigns .Most important reason is of course to accommodate larger numbers of students in computer labs.

THE SURVEY

While educational institutions are trying their best to provide up to date IT facilities and labs to their students, increasingly higher numbers of students own personal IT equipment. In this survey, we aim to determine what kind of IT equipment do university students own and what kind of learning benefits will be gained because of this ownership .In other words, what is the influence of those IT equipments on their academic studies and success levels. The results are also expected to give an idea about the percentage of computer ownership

The survey included various departments and was performed with a participation of 470 students. In the first step, we aimed to determine the number and percentage of participants who own a computer. For this paper the type of the owned computers are not considered to be very relevant. Of course mobility of the main tool may be important but this doesn't seem to affect directly the learning curve. It can be said that the participants of the survey constitute a representative sample of all the students of Yasar University.

In addition to identification questions like age, department and name, the questionnaire included the following eight questions:

1. Do you own a personal computer?
2. Which purpose do you use the computer for?
3. What kind of computer do you have?
4. Do you have the necessary software to follow the courses?
5. How many hours do you spend at the computer?
6. How many hours do you spend for home works, research, etc.?
7. Where do you prepare your home works?
8. Which search engine do you use for your research?

As it can be seen, the survey was focused on the usage of computers. It was necessary to record student names and departments to link the results of the survey with their grades. The grades were given in an interval between 0 and 100.

The survey results were expected to give some idea about how the ownership influences the learning and success levels of the students. However, it is not healthy to say that computer ownership is the only factor that influences the learning curve of a student .How the computer is used and the time spent on the computer are also important. It is unnecessary to say that, a student who uses the computer only for game playing and Internet surfing will suffer from adverse effects this kind of usage on his or her achievements.

The last question of the survey should show not only the popularity levels of search engines, but also the awareness of the students in finding information resources.

Based on these considerations we created the model shown on Fig. 2.

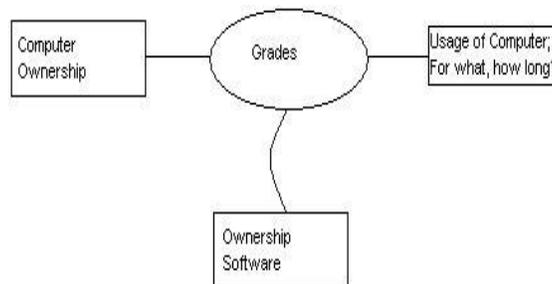


Figure 2: Assumed Model

The model is based on direct relationships between the learning curve and computer ownership (question 1) and the usage of computers (questions 2, 5 and 6). The ownership of the software is used in the model just as a control variable.

The results that are given below in a simplified version, just show the percentages of students in various categories.

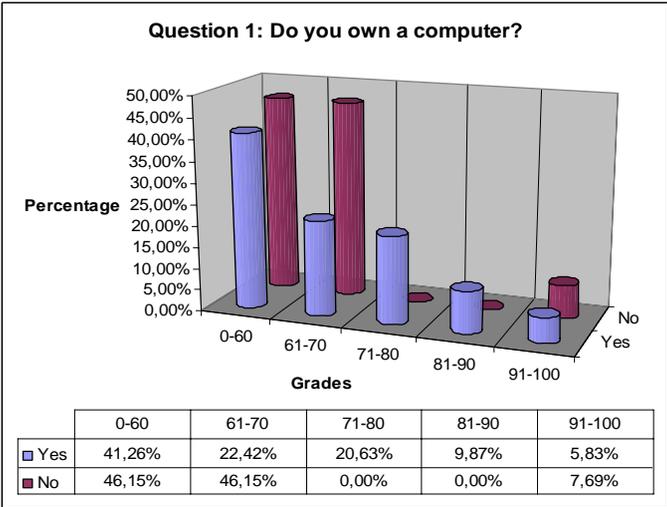


Chart 1: Relationship between Computer ownership and grades

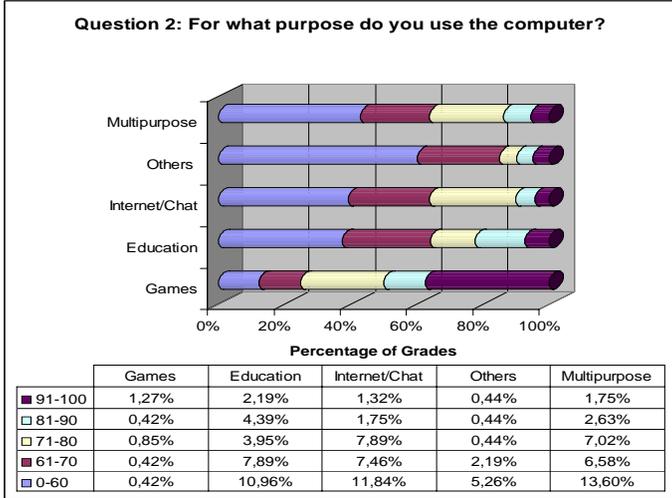


Chart 2: Usage areas of computer

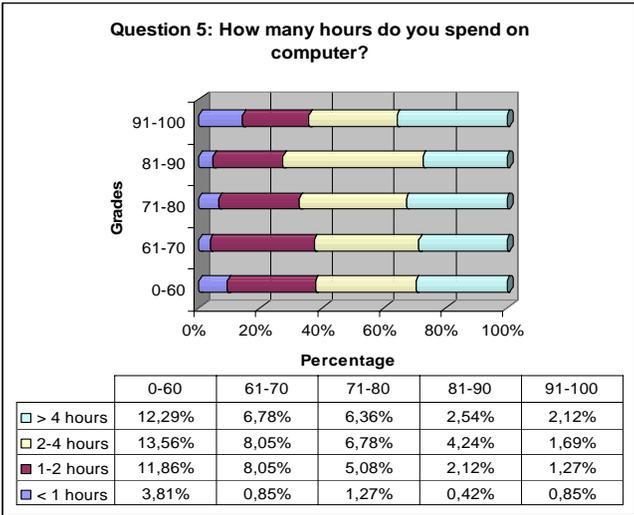


Chart 3: Time spent on computer

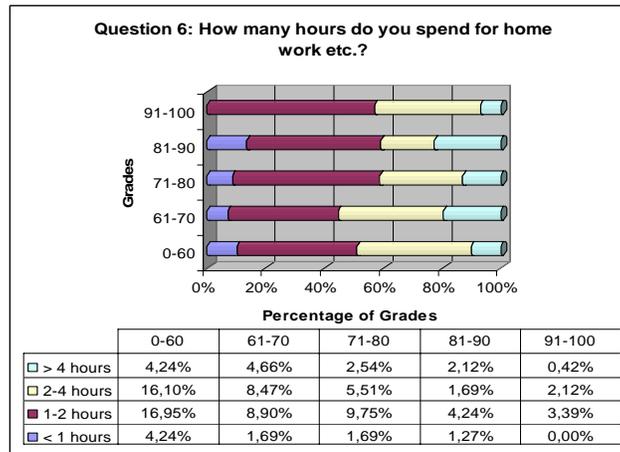


Chart 4: Time spent for home works

The results reveal some interesting facts about computer usage patterns and grades. It was not up to our surprise that 94.5% of the participating students do own computers, as can be seen on Chart 1. But it was surprising to see that nearly 8% of the students who have a grade over 90 didn't own computer. This brings us to consider how the computers are used. We didn't assume that students use computer only for education. It was also not surprising to see that many students use their computers mostly for internet and chatting purposes (Chart 2), but the more interesting part is that the proportions in the fields of educational use and internet/chat are nearly equal. It was also expected that students who failed their courses would use the computer for some other purposes than just for education. Only students who have high grades prefer the educational usage of computers rather than other purposes.

According to the motto "not quantity but quality", we wanted to know how many hours do the students spend using the computer (Chart 3). In question 5 it was not intended to know how many hours do the students spend on computers for their home works or related academical works. In this question we merely wanted to find out the total time spent on computers. The survey showed that students who use the computer more than four hours a week failed the course more frequently. This brings us again to the question for what purpose the computers are mainly used. As a representative question for the quality of computer usage, the students were asked about their usage times of computers only for home works and related academic works like research etc (Chart 4). To our surprise most of the students who failed their courses use their computers more than 2 hours for home works (32%).

Another interesting finding is that students in the highest grade category do not use computer excessively. How can it be explained that students who have high grades use the computer only for 2-4 hours? Of course this is not an indication for the lesser usefulness of computers in the highest ranking group. A possible explanation could be that those students use their computers and educational software more efficiently.

CONCLUSION

The idea of digital campuses and supporting teaching using modern IT equipment sounds in many cases very appealing. Another common belief is that the ownership of computers has a highly positive effect on student's success level in academic courses. This was also the major hypothesis of our study. Namely it was assumed that, students would receive higher grades in IT related courses by spending enough time on computers for their course works. The survey results differ to some extent from this assumption. Namely, it seems that the amounts of time spent on computers for course works has no obvious contribution for improving the grade levels in all student categories, except possibly the "average" students. The major factor turns out to be the effectiveness of learning process, with or without a computer. We also conclude that students should receive more guidance for using computers to improve their learning. One way of doing this is to use carefully designed educational software.

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