UNDERGRADUATE STUDENTS ATTITUDES ON THE USE OF COMPUTERS IN EDUCATION

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Abstract
The first aim of this study was to determine undergraduate students' attitudes on the use of computers in education. A questionnaire as survey was administered to 156 undergraduate students in two departments - the Department of Educational Sciences, and the Computer and Educational Technologies - at Canakkale Onsekiz Mart University during the fall 2003 semester.

A second aim of the study was to determine whether there were differences in attitude between the two groups on the use of computers in education. Of the 156 students, 90 were from the Department of Educational Sciences and 66 were from the Department of Computer and Educational Technologies.

According to the top 5 attributions ranked by students, computers: 1-Individualize learning, 2-Are self-paced, 3-Allow students to work privately, 4-Are fun and entertaining, and, 5-Are excellent for drill and practice. These attributions were the reasons of using the computers in education. We found 9 attributions in which there was a statistically significant difference between the two groups.
Key Words: Computer; Higher Education; Student Attitudes
Introduction

Technology is the main support for the students learning developments nowadays and the computers are the main technology support as a tool for effective learning and teaching process. Technologies offer considerable promise for meeting the needs of adult students, because they can deliver learning in places other than classrooms, facilitate the efficient use of precious learning time, sustain the motivation of adult learners, and reach many different types of learners in the ways they learn best. Technology has the potential to eliminate some barriers to participation and address some of the unique needs of adult students.

Within the today's application, it is important to get the meaningful learning for the students' learning cycle. It is not necessary to get information directly from the instructors, what is important today is that experiencing reality, discovering reality with technology guidance. When we look at issues and ahead, we can commend that technology has main responsible process in instruction for today educational world. With the development of high technology improvements, students get main role in their learning process. (Grabe, et. al, 2001; cited in Isman et. al, 2004).

Educational technology has changed the definition of the classroom in terms of location, size, composition, learning environment, and teacher role. Educational technology in developing nations helps people in poor and rural areas. The Association for Educational Communications and Technology (AECT) officially adopted and approved the following definition of 'Instructional Technology': "*Instructional (educational) technology is the theory and practice of design, utilization, management and evaluation of processes and resources for learning*" (Seels & Richey, 1994,1).

There is a concrete role of computers in society and schools. It is discussable about bringing to educational change through computer developments. Computers provide work speed, work efficiency, work power and removal of human error from work activities. The computer as productivity tool and instructional technology has great role in education. Computers have role to support easy study of students with their learning process.

Many of the researches implicate that computer and high technology developments materials require equal standards, opportunities and meaningful learning for students. In order to understand effectiveness of computer, today application of the instruction that is student centred instruction will give the light to determine through examining the attitudes, of students towards technology, especially computers as the main indicator of technology and learning productivity. With these brief facilities of computers, it is understandable that computers and high information technology effect the students' learning and studying. It is questionable how effectively affect and what are the attitudes of students toward computer role in education (Forcier, 1996; Maddux, et. al., 1997; cited in Isman et.al, 2004).

Student attitudes have contributed to our understanding of why computers have enhanced achievement and performance and motivation. Computers are profit tools for individual and student-centred learning, so, in order to be informative and reflective on the use of computers, there should be determine of the students' attitudes on the use of computers.

The main aim of this study is to determine undergraduate students attitudes on the use of computers in education.

Review of the Literature

In this section, at first, the related researches will be introduced and evaluated, then, the importance of the study will be described;

Related Researches

There is a wealth of computer attitude scales available in the literature. Many instruments have been developed with the purpose of measuring computer anxiety_and other computer-related attitudes. (Montag, Simonson & Maurer, 1984; Gressard & Loyd, 1984; Erickson, 1987; Jones & Clarke, 1994; Kay, 1993). There are a number of studies which provide useful empirical comparisons of available computer attitude scales (Gardner, Discenza & Dukes, 1993; Woodrow, 1991).

Garcia (2001) reported a practical, multi-dimensional, easy-to-administer research tool specifically intended to assess the attitude of learners towards multimedia-enhanced instruction. The specificity of this 25-item instrument constituted a powerful tool for the assessment of student attitudes towards multimedia technology when this was used for educational purposes. This instrument was tested by Garcia on 40 subjects. The internal reliability coefficient for each of the attitude sub-scales making up the survey - student attitudes on individualized instruction; student attitudes toward self-paced instruction; student attitudes toward the user-friendliness of the learning-environment; student levels of anxiety when working with multimedia; and the general opinion of the students toward their experience with the instructional material - showed a high degree of internal consistency. The independence of these subscales has allowed practitioners, evaluators and researchers to make their own selection of factors in order to adapt the survey to meet their own needs with an eye toward evaluating and predicting the performance of learners in a multimedia-enhanced learning setting.

Zhang and Espinoza (1998) investigated the relationships among computer self-efficacy, attitudes toward computers, and desirability of learning computing skills. Three hypotheses were tested using the "Attitudes toward Computer Technologies" and "Confidence and Desired Knowledge with Computer Technologies" measures. Statistical analyses consisted of bivariate correlations and simultaneous multiple regression. The findings included that comfort or anxiety about computers perceived by students predicted their confidence levels about computers. Students' self-recognition of usefulness of computers and their perception of advanced levels of computer technologies were significant predictors in deciding their desirability of learning computing skills.

Mitra(1998) administered a comprehensive questionnaire consisting of attitude and use items to the entire student body of a 4-year undergraduate university. A response rate of 38% resulted in 1,444 completed surveys. A principal component factor analysis supported the a priori assumption that there were 5 independent categories of computer use. Respondents indicated different levels of computer use. Word processing was the application used most frequently. Other uses included e-mail for task and no task activities and mathematical and statistical computations. Moreover, significant differences were observed between the mean attitudes of the low and high users of all the different categories of use. Respondents who reported higher use of computers indicated a more positive attitude toward computers on all the different attitude scales. Finally, significant correlations were observed between the attitude items and the categories of use. The results suggest that computers are used for several different activities and the level of use is related to attitudes toward computers.

McKinnon, Nolan and Sinclair (2000) determined that an integrated curriculum project in New Zealand generated educationally interesting but paradoxical results regarding student motivation and attitudes toward computer use. Students mastered and used a range of computer applications, becoming enthusiastic users to the point of regarding the computer as indispensable as pens and pocket calculators. Performance of three cohorts of students in the nationwide school certificate examination showed that project students performed significantly better than peers in the parallel traditional school program. Yet student attitudes toward computers became significantly less positive during their junior high school careers. This article illuminates and explains the paradox through comparative analysis of the relevant findings. It examines implications for the design and implementation of curriculum programs that will involve student use of and control over many and diverse forms of compelling computer applications, from CD-ROMs to the Internet.

Mitra and Steffensmeier(2000)examined the pedagogic usefulness of the computer by focusing on student attitudes and use of computers in a "computer-enriched" environment. Their analysis used data from three years of a five-year longitudinal study at Wake Forest University. The results indicated that a computer-enriched environment was positively correlated with student attitudes toward computers in general, their role in teaching and learning, and their ability to facilitate communication. In addition, there were few changes in attitudes for students who did not have seamless access to the network. This study concluded that a networked institution where students have easy access could foster positive attitudes toward the use of computers in teaching and learning.

In a study (Daigle; 2003) 191 students (131 traditional, 60 non-traditional) enrolled in similar junior-level courses at three universities were surveyed about their computer attitudes using a "Computer Attitude Scale", a well-validated and widely-used instrument. Respondents also provided demographic information, including age, and answered questions regarding computer experience. While both traditional and non-traditional students had positive attitudes towards computers, those of non-traditional students were significantly more positive. Further, both groups had extensive computer experience; non-traditional students appeared to have greater work-related computer experience, which likely explains the more positive computer attitudes. Therefore, results appear to show that, as applied to accounting students, the typical concern that non-traditional students may be more intimidated by computers likely does not exist, thereby increasing their chances of success for accounting-related careers.

Isman et al (2004) investigated students' attitudes about computers based on gender, education level of their mothers, education level of their fathers, having computers at their homes, having education about computer and position of students by the support of statistical analysis and evaluation that questionnaire results were the basis of these evaluations. The population under investigation included undergraduate and graduate students taking courses in Eastern Mediterranean University at Northern Cyprus. Sample selected by the method of random sampling as a hundred fifty five students registered in courses during Fall 2002-2003 school year in Eastern Mediterranean University who were graduate and undergraduate students. For this research study, questionnaire was designed for analyzing students' attitudes towards computers. Survey was designed according to outlines of "Tendency towards Computer Based Education of Students at Secondary Schools". There were 46 items at this instrument. Their responses that are representing forty items are on a series five-point Likert-scale.(5=strongly disagree and 1=strongly agree).Students' responses to the questionnaire were statistically analyzed according to gender, education level of their mothers, education level of their fathers, having computers at their homes, having education about computer and position of students. Questionnaire as survey was designed to get the perceptions of students towards computers. All reflections about the study that was "students' perceptions towards computers" concluded that students gave importance to the computers as a part of their life. In addition to this, research results represent that high percentages concentrated on that there were positive attitudes towards computers because of being tool to organize life efficiently. When it was examined the results of research and questionnaire, students had positive tendency the useful and easy reflections of computers.

Evaluation of the Literature and Importance of Research

Prior studies concerning with the students attitudes on the use of computers show that students give importance to the computers as a part of their life and high percentages concentrated on that there are positive attitudes towards computers because of being tool to organize life efficiently. Students have positive attitude the useful and easy reflections of computers.

Significant differences were observed between the mean attitudes of the low and high users of all the different categories of use. Significant correlations were observed between the attitude items and the categories of use (Mitra, 1998).It can be said that those computers are used for several different activities and the level of use is related to attitudes toward computers.

Attitudes toward computers, computer self-efficacy, and commitment of learning computing skills have been recognized as important factors to assist college students in acquiring computer technologies. However, little research has been done on the combination of these factors.

Computers are profit tools for individual and student-centred learning, so, it is important to determine student attitudes on the use of computers, because student attitudes have contributed to our understanding of why computers have enhanced achievement and performance and motivation. Computer attitudes are important because of the long-documented relationship between computer attitudes and motivation and performance (Mills, 1997; Igabaria et al., 1990; Eason & Damodaran, 1981, Shneiderman, 1979). Student attitudes toward computers became significantly less positive during their junior high school careers. As the results of some prior studies (McKinnon, Nolan and Sinclair;2000; Mitra and Steffensmeier,2000;Garcia,2001)indicate ,we think that a computer-enriched environment and network and multimedia-enhanced learning setting are positively correlated with student attitudes toward computers in general and they can foster positive attitudes toward the use of computers in teaching and learning.

Attitudes towards technology can be determined through knowing the attitudes about computer in different educational cycles, groups and departments. Prior studies comparing computer attitudes of traditional versus non-traditional students have been mixed (Orr et al., 2001; Parish and Necessary, 1996; Smith and Necessary, 1996; Busch, 1995; Klein et al., 1993; Baack and Brown, 1991).
While both traditional and non-traditional students had positive attitudes towards computers, those of non-traditional students were significantly more positive. Further, both groups had extensive computer experience; non-traditional students appeared to have greater work-related computer experience, which likely explains the more positive computer attitudes.

As above mentioned, although a few study have been done on how students' attitudes are same or differ from each other depending on which groups such as traditional and non-traditional but no study has focused on how undergraduate students attitudes differ from each other depending on which department they are in.
In order to be reflective and recommend on the use of computers, there should be examination and determine of the students' attitudes on the use of computers. The importance of the research is to point out that computer has an impact on students' learning developments and in today student centred instruction, the attitudes of the students can only reflect the use of computers and facilities.
Anyone can assume that students develop different attitudes towards computers depending on the departments they are in, but the importance of the research is to determine that which students' attitudes different from each other depending on the departments they are in; and moreover to determine that what the attributions are on which there are statistically significant differences between the students attitudes depending on which department they are in.

Aim of the Research

The first aim of this study was to determine the attitudes of undergraduate students on the uses of computers in education. A second aim was to determine whether there were statistically differences in attitudes between the students of the Department of Computer and Educational Technologies and Department of Educational Sciences at Canakkale Onsekiz Mart University(Turkey)

Methodology

Sampling and Gathering of Data

To determine student attitudes on the use of computers in education, it was administered a questionnaire as survey to the undergraduate students at the Departments of Educational Sciences and Computer and Educational Technologies during the fall 2003 semester. This questionnaire was constructed by using of a list of reasons (Cotton, 2002) given by students for liking CAI activities and/or favouring them over traditional learning.

The questions in the questionnaire were divided into two sections; the first part consisted of questions concerning personal information and, the second part of the questionnaire included attributions on the use of computers in education and consisted of 23 questions.

Contained in the questionnaire were 23 attributions in which students were questioned regarding their attitudes toward the computer and its educational use. The likert format was in the questionnaire with 5 scales: strongly agree, agree, neutral, disagree and strongly disagree.
Content validity is the only type of validity for which the evidence is logical rather than statistical and it is difficult to separate content validity from other types of validity (Kaplan & Saccuzzo, 1989).So, to determine the

validity of questionnaire it was used the content-related validity and according to the opinions of the experts, it was attempted to determine whether the questionnaire has been constructed adequately.
Test-retest reliability is relatively easy to evaluate (Kaplan &Saccuzzo, 1989). It was used selected and evaluated the time interval between sessions and the reliability of the questionnaire was estimated to be r =0.82.
The questionnaire of 156 students included the students in the Departments of Educational Sciences and Computer and Educational Technologies of Educational Faculty at Canakkale Onsekiz Mart University (Turkey). The average age of the sample was 22.9 years. The sample included all students majoring in their second and third years of these departments. The total number of the sample was 156, and of these, 90 were undergraduate students at the Department of Educational Sciences, and 66 were undergraduate students at the Department of Computer and Educational Technologies.

Analysis of Data

The statistical techniques used in this study were the following: Content-related validity; Test-retest reliability; Frequency and percent; Mean score and arithmetical mean; "t" test; One-way analysis of variance and Kruskal-Wallis test.

In the study to determine the questionnaire validity it was used the content-related validity, which is the only type of validity for which the evidence is logical rather than statistical (Kaplan and Saccuzzo,1989).To determine the reliability of the questionnaire it was used test-retest reliability ,which is relatively easy to evaluate (Kaplan and Saccuzzo,1989).

The mean and median scores were computed for each attribution, and a rank ordering was obtained in order to make clear the attributions that are ranked of strongly agreed and disagreed by the students. The rankings were based upon the mean score for each of the questions.

In the study to make clear the significance of the difference of means of two departments, it was used some parametric tests such as t-test; one-way analysis of variance; and non-parametric test such as Kruskal-Wallis test.

Findings

To determine the attributions of computers in education that were ranked "strongly agree" and "strongly disagree" by the students , the attributions were presented in rank order by the magnitude of the mean score in Table 1.

The mean and median scores were computed for each attribution, and a rank ordering was obtained. The rankings were based upon the mean score for each of the questions. A mean score of 4 or higher indicated that a particular factor was rated either an "agree" or "strongly agree" attribution for using computers in education. Students first ranked the "individualize learning" attribution and they strongly agreed that computers individualized learning.

The top five attributions were the following:

Computers: 1-Individualize learning;2-Are self-paced;3-Allow students to work privately;4-Are fun and entertaining;5-Are excellent for drill and practice.

Table 1: Attributions in Rank Order by Magnitude of Mean Score (On a scale of 1 to 5)
Strongly disagree
Disagree
Neutral
Agree
Strongly agree

Attributions	Average Student Ranking
Computers;	
1. Individualize learning	4.52
2. Are self-paced	4.51
3. Allow students to work privately	4.39
4. Are fun and entertaining	4.32

5. Are excellent for drill and practice	4.29
6. Make it possible to experiment with different options	4.27
7. Do not embarrass students who make mistakes	4.20
8. Work rapidly, closer to the rate of human thought	4.01
9. Give a sense of control over learning	3.94
10. Teach in small increments	3.91
11. Give immediate feedback	3.74
12. Are great motivators	3.49
13. Never forget to correct or praise	3.47
14. Never get frustrated or angry	3.45
15. Never get tired	3.41
16. Are infinitely patient	3.22
17. Are impartial to race or ethnicity	3.99
18. Eliminate the drudgery of doing certain learning activities by hand	3.93
19. Help students improve than teachers	3.80
20. Are more objective than teachers	3.80
21.Are free teachers for more meaningful contact with students	2.85
22. Build proficiency in computer use which will be valuable later in life	2.80
23. Call for using sight, hearing and touch	2.74

The results show that the students are aware that the computer is an individual and self-paced learning tool that allows them to work privately, and that they want to drill and practice in an enjoyable environment on their own. These attributions of computers are directly related to the concept of motivation. Computer attitudes are important because of the long-documented relationship between computer attitudes and motivation [Mills, 1997; Igabaria et al., 1990; Eason & Damodaran, 1981, Shneiderman, 1979]. There was an attribution concerned with motivation in the questionnaire but the students ranked it 12th.
The attributions on which there were statistically significant differences between the students in the Departments of Educational Sciences and Computer and Educational Technologies were listed in Table 2.

It was used the Kruskal-Wallis Procedure for the difference in the medians, and the t-test for the difference in the means. Nine attributions were found in which there was a statistically significant difference between the two student groups.

On 8 of the items, the students of Computer and Educational Technologies scored the attributions as ‘agree to strongly agree’ whereas the students of Educational Sciences scored them as ‘neutral’ or ‘agree’.

The Pearson correlation coefficient between these two groups was 0.567. The positive “t” value indicated that the mean score for the students of Computer and Educational Technologies was higher than the mean score for the students of Educational Sciences. This was true for 8 of the 9 attributions.

Table 2: Attributions on which there was a Statistical Difference between Two Groups

Attributions	“t” Value	“p” Value
Computers;		
1. Teach in small increments	+4.11	0.01
2. Never forget to correct or praise	+2.62	0.00
3. Are excellent for drill and practice	+5.41	0.00
4. Are more objective than teachers	-4.36	0.00

5. Call for using sight, hearing and touch	+3.57	0.00
6. Make it possible to experiment with different options	+3.05	0.00
7. Help students improve their spelling	+3.06	0.00
8. Are free teachers for more meaningful contact with students	+2.54	0.01
9. Eliminate the drudgery of doing certain learning activities by hand	+3.91	0.00

Discussion and Suggestions

The results of this study show that the undergraduate students strongly agree that computers individualize learning. This result show a consistency with results of some prior studies (Grabe, et.al; 2001; Forcier, 1996) implicating that computer require active and individual learning for students. According to their attitudes; computers are self-paced, fun and entertaining tools, which furthermore, allow them to drill and practice perfectly and privately. These were the top 5 attributions ranked by students.

According to the lowest 5 attributions ranked by students, the results show that the undergraduate students do not think (or know) that computers help them to improve their spelling. They did not compare (perhaps did not want to compare) the computer with their teacher. It was not important that computers were available teachers for more meaningful contact with them and were more objective than their teachers. They said that building proficiency in using computer, which would be valuable later in life, was never important, furthermore they didn't think that the computers were impartial to race or ethnicity. As mentioned above, they strongly agreed that computers individualize learning.

The results of this study showed that in 9 attributions there was a statistically significant difference between the two student groups. On 8 of the items, the students in the Department of Educational Sciences scored the attributions as "agree" to "strongly agree" whereas the students of Department of the Computer and Educational Technologies scored them as "neutral" or "agree". The mean score for the Department of Computer and Educational Technologies was higher than the mean score for the Department of Educational Sciences.

The results show a remarkable consistency with the results of prior studies in related literature, so that, the undergraduate students agree that the computers individualize the learning and they want to use of the computers in education and their attitudes on the uses of computers in the education are positive. The students' attitudes contributes to our understanding of why computer assisted education (CAE) enhances the student achievement.

On 8 of the items, the students of Computer and Educational Technologies scored the attributions "agree" to "strongly agree", whereas the students of Educational Sciences scored them as "neutral" or "agree". Students of Computer and Educational Technologies scored the attribution of "Computers are excellent for drill and practice" as more significant than the students of Educational Sciences. This may be explained by the fact that the students of Computer and Educational Technologies are generally involved in drills and practices with computers, and moreover they learn in a computer enriched and multimedia-enhanced learning and instruction, so they may find more time for drill and practice with computers. This result shows a remarkable consistency with the result of prior study (Mitra, 1998) showing that the using level of computers is related to attitudes towards computers. Furthermore the students of Computer and Educational Technologies have more prior experience with computers than the students of Educational Sciences. As Mitra and Steffman (2000) said there is direct relationship between computer experience and computer attitudes.

Moreover ,the results show a remarkable consistency with the results of some prior studies (Mitra and Steffensmeier, (2000); McKinnon, Nolan and Sinclair (2000); Garcia, (2001) determining that computer enriched environment and multimedia-enhanced learning settings are positively correlated with students attitudes towards computers in general and they can foster positive attitudes toward the use of computers in education.

The results of this study show that the mean score for students of Computer and Educational Technologies was higher than the mean score for students of Educational Sciences. This was true for 8 of the 9 attributions. If we consider the fact that the students of Computer and Educational Sciences because of their department and lectures work more in the computer environment and benefit more from these tools in education, this result may be very normal.

The using of the computers in education is not only interested with the Department of Computer and Educational Technologies, so, faculties of education should benefit from the results of our study for further academic planning, furthermore they should not only provide the opportunities of computer education and computer assisted education for this department but also they should take into consideration the other departments of

faculty. They should take into consideration the attitudes of the undergraduate students on the uses of computers in education and should prepare the courses required computer using for their students. Because as the students' success increases the success of the university increases.

The numbers of studies on how undergraduate students' attitudes differ from each other depending on which department they are in. are insufficient in the literature. A lot of further research needs to be done about this topic. Generally, quantitative and descriptive research methods and different surveys were used in the literature and data were analyzed through the prepared questionnaire, but further researches should also include some experimental and empirical studies comparing computer attitudes of undergraduate students and focused on how undergraduate students attitudes differ from each other depending on which department they are in.

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