AN EVALUATION INTO THE VIEWS OF CANDIDATE MATHEMATICS TEACHERS OVER "TABLET COMPUTERS" TO BE APPLIED IN SECONDARY SCHOOLS

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ABSTRACT
This study aims to investigate, in terms of different variables, the views of prospective Mathematics teachers on tablet computers to be used in schools as an outcome of the Fatih Project, which was initiated by the Ministry of National Education. In the study, scanning model, one of the quantitative research methods, was used. In the population of the study is involved 130 prospective Mathematics teachers who study Mathematics Education at the Department of Primary Education, Faculty of Education, Giresun University in 2013 and 2014 Academic Year. The data of the study were obtained with the usage of 'Tablet Pc Questionnaire Form' developed by the researcher himself and 'Computer Attitude Scale' devised by Bindak and Çelik (2006). The data obtained from the study were analyzed with the tests known as percentage, frequency, single-factor Anova and Chi-square. The results indicated that there is a significant difference between prospective teachers' Computer Attitude Scores and their tendency to supporting 'Tablet Computers'. Similarly, prospective teachers' conditions of supporting the usage of 'Tablet Pc Computer' show significant differences in terms of computer-use frequency, while no significant differences were found in terms of the case of the need to take in-service courses, the case of having a classroom and computers, the time, frequency and objective of computer-use. However, in terms of gender, significant differences were found between prospective teachers' views. In addition, prospective teachers stated that the usage of tablet-computers in Mathematics Course could provide you with two advantages. First, Mathematics classes could become more enjoyable than it used to be through visuals and animations. Second, the abstract concepts in Mathematics could become more understandable. However, the disadvantages stated by prospective teachers are as follows: 1) The communication between Mathematics teachers and students could be reduced and, 2) social interaction between students might be reduced.
Keywords: Prospective Mathematics Teachers, Fatih Project, Tablet Computer.

INTRODUCTION

This is a rapidly developing and changing world where knowledge has doubled and technology has been constantly developing. In line with these developments, new technological devices have gradually emerged. Technological devices have been benefitted throughout the history. A few years are regarded as a long period for technological world. The powers and features of these technological devices have increased logarithmically with the developments. In parallel with this, the variety and usage of technological devices have been increasing in education as well. It is true that people have a need for an improved technology in order to achieve and spread knowledge in current age. Known as processing, producing, saving, using, sharing and spreading knowledge, technology has a significant role in this age. Communities and individuals being able to have an access to knowledge, make it available for their own usage and make an addition to it and spread it are regarded as powerful. Such a great importance attached to knowledge and technology and using them in an intensive way in social fields are considered one of the most important factors that require structural changes in the field of education as in other fields (Erişen & Çeliköz, 2007).

Children born after 2000 are grown up with technology and studying through traditional methods make them bored and lead them to memorize things. They have shares on social media instead of electronic posts. They can adapt to digital world so rapidly. In this context, the attitudes and habits of these people and their expectations and learning methods could change. It is a fact that some activities should be arranged for visual and audial devices in the process of learning and teaching in order to realize an effective learning (Çepni & Akyıldız, 2010). The way to address more sensual organs could be possible with making educational systems compatible with informatics technologies (Alkan, Tekdere & Genç, 2003). In order that both teachers and students are able to perceive and absorb what is taught as topics and issues in teaching programs, technological devices have been used in an intensive way for in-class learning and teaching activities (Yiğit et al., 2007). Using the most advanced technology in education would enable to carry out the requirements of education in line with needs for the age and also achieve the highest productivity in education (Arslan, 2003).

With the introduction of technology in mathematics education, it is still vague whether mathematics teaching changed or not. While technology is moving with giant steps, teachers have adapted this technology to traditional teaching methods and techniques. As using the methods and techniques, audio, vision and action are all used. Old books were replaced with colorful books and the books used in electronic media. Even though there

is no problem in this sense, it hasn't brought about a dramatic change in our learning and teaching experience (Baki, 2008). The function and status of teacher is very crucial in education. The changes to be made in education is primarily based on making teacher active, educational approach and mathematical manner. In the basis of the ongoing problem in mathematics teaching lies lack of qualified teachers. In the first place it comes lack of knowledge or stability and shallowness in the accumulation of knowledge. Teacher hasn't been able to achieve what was expected from the precautions taken to eliminate professional incompatibility with programmed course books, in-class technological devices such as television, video, computer and so on (Yıldırım, 2000). A professional teacher will never ask students to do poor quality tasks. Meaningless memorization, so-called homework and projects given to students that were all encountered at schools so frequently are not the tasks that a professional teacher asks students to do. What is expected from a professional teacher, instead, is that he should bear mind to educate students to use their powers in an effective way and know their ideal capacities and use them in this way (Altan, 2010). In addition, teacher should help students to understand the processes related to mathematics and make a connection between the concepts and processes (Baykul, 2011).

One of the significant technological devices started to be used in education is tablet computer. Tablet computers have all the properties other computers have. One of the features that tablet computers have is capable of using special pen to write on screen (Cox, 2006, Fister & McCarthy, 2008). In addition, the advantages of these computers for teachers are that they can be written and erased very easily, they can be used to show the slides and that they can be used to give a copy of the course notes to students (Gill, 2007, Galligan, Loch, McDonald & Taylor, 2010). On the other hand, tablet could be used as an electronic board with the projection system. A tablet computer will enable teachers and students to use limitless pages, various kinds of inks without erasing (Weitz, Wachsmuth & Mirliss, 2006). Contrary to traditional computer, tablet computers enable teachers and students to contact directly through computer documents in the classroom and to clean and talk about them (Anderson, 2004). When it comes to the publishing of the books handed out freely, the paper cost, distribution and usage of them, it is likely to say that tablet computers are practical and economic. It would unburden students from carrying a pack full of books and notebooks. The notes students take and the assignments they do could be checked by teachers as a distant system. In the current time when central exam system has been discussed, the collective exams of the students could be arranged by means of tablet computers at schools concomitantly. The results could be learned in the interactive media at the same time. As it was introduced from 2002 onward, tablet computer has turned into a useful device gradually for educators (Mock, 2004). The Fatih Project in Education has been carried out by the ministry and it was planned to spread it all over the nation in the period of 2011-2014. The project envisaged to provide primary, secondary and high school with supporting the infrastructure through interactive LCD panel boards, tablet computers and the Internet access in order to use informatics technological devices in the process of learning-teaching to provide equality of opportunity in education and improve technology at schools (MEB, 2012).

Developed countries have carried out intensive researches in order to determine the efficacy of tablet computers in the environment of teaching-learning in line with certain objectives and targets. There is similar need in Turkey as well and it is necessary to make researches over the efficiency of tablet computers in learning-teaching in order to meet that need. It is hoped that the current study would fill a significant gap and that the findings to be obtained would be useful for teacher to review their knowledge over tablet computer usage and beneficial for academicians conducting studies in this field. In addition, the data to be obtained in this study would provide benefits during the implementation of the project. The purpose of the current study was to determine the views of secondary education candidate mathematics teachers over the usability of tablet computers that has started in some schools by the Ministry of Education within the content of FATIH project, to make analysis with the findings obtained and to give some recommendations related to the issue.

METHODOLOGY

Research Model

A quantitative research method was adopted and a survey method was used in this study. Survey model is a research approach aiming at describing a present or past situation as it is (Karasar, 2002). In these kinds of studies, the aim is not to make a generalization but to make a section, reflect a certain case in a detailed way and shed light for the future.

Population and Sampling

The sampling of the research was made up of 130 candidate Mathematics teachers, 40 boys and 90 girls, having an education in Giresun University, Faculty of Education, Primary Education Mathematics Teaching Department in the academic year of 2013-2014.

Data Collection Instrument

As the data collection instrument, the questionnaire form developed by the researcher was used. While preparing this questionnaire form, the author benefitted from the computer attitude scale developed by Bindak and Çelik (2006) with a reliability coefficient of α =.91. In the comment of the scores obtained in the computer attitude scale which had a total sum of 22 items, the formula of range width (a=row width /the number of groups). The content validity of the questionnaire was obtained with the expert opinion. The first part of the questionnaire form, which was made up of two parts, was comprised of 6 questions aiming at determining the demographic information, while the second part was composed of 4 questions in total, 2 ranking scaled about the views related to tablet computers and 2 classifying scaled questions.

The Analysis of the Data

In the analysis of the data, SPSS 17 package program was used. Arithmetical means, standard deviations and numbers (N) depending on the personal features of the students answering the questionnaire for both dimensions were determined in the analysis. Whether there was a statistically significant difference between answers students gave to the questionnaire was determined through t test, F test and Chi-square tests. The data regarding numerical developments were tabulated and evaluated and whether there was a difference between the independent variables was tested at α = .05 significance level.

FINDINGS

The relation between the status of supporting tablet computers at mathematics courses by candidate mathematics teachers and computer attitude total scores were examined. The main tendency of the views of candidate mathematics teachers in this issue and main changing measurement values were given in Table 1 and Table 2.

Table 1: ***Main Tendency and Changing Measurements with regard to Computer Attitude Scores of Candidate Mathematics Teachers.***

The status of supporting tablet computers	N	$\overline{X}$	S
Yes	61	2.87	.30
No	54	3.09	.25
No idea	15	2.90	.21
Total	130	2.97	.29

As given in Table 1, total scores arithmetical means of the computer attitude scale for the candidate mathematics teachers participating in the research and supporting the usage of table computers in mathematics courses was found as ($\overline{x}$) 2.87 and that of the candidate teachers not supporting was ($\overline{x}$) 3.09 and the mean for the candidate teachers having no idea was ($\overline{x}$) 2.90.

One way variance analysis was made for the unrelated measurements over whether mean scores of computer attitude scales of candidate teachers participating in the research differed and the results were given in Table 2.

Tablo 2: ***The Results of One Way ANOVA for Unrelated Measurements regarding the Computer Attitude Scores of Candidate Mathematics Teachers***

Source of Variance	Total Square (TS)	SD	Square Means (SM)	F	P	Significant Difference
Inter-groups	1.41	2	0.71	9.76	.001	1-2 2-3
Intra-groups	9.17	127	0.07			
Total	10.58	129				

1-Yes, 2-No, 3-No idea

As given in Table 3, a significant difference was found between the computer attitude total scores of the candidate teachers supporting that tablet computers should be used in mathematics courses and those of the ones not supporting it in favor of the candidate mathematics teachers supporting tablet computers [$F_{(2\text{-}127)}$= 9.76, p<.05].

The status of the supporting using tablet computers in mathematics courses by mathematics candidate teachers was examined in terms of different variables and given in Table 3.

Table 3. ***The Distribution of the Status of the Supporting Using Tablet Computers in Mathematics Courses by Mathematics Candidate Teachers was Examined in Terms of Different Variables***

Variables	Status of the supporting using tablet computers						Sign. Diff.
	Yes		No		No Idea		
	F	%	F	%	F	%	
Gender							λ^2 (2)= 2.632; p = .268 p > 0.05
Man	23	57.5	13	32.5	4	10	
Woman	38	42.2	41	945.6	11	12.2	
Year							λ^2 (2)=1.785; p= .410 p > 0.05
1st Year	27	45.0	28	46.7	5	8.3	
2nd Year	34	48.6	26	37.1	10	14.3	
Status of having a computer							λ^2(2)=10.32 ; p = .06 p > 0.05
Yes	51	54.3	31	33.0	12	12.8	
No	10	27.8	23	63.9	3	8.3	
Period Using Computers							
1-4 yrs (university)	3	18.8	10	62.5	3	18.8	λ^2 (6)=8.79; p= .19 p > 0.05
5-7 yrs (High School)	22	47.8	20	43.5	4	8.7	
8-10 yrs (Pri. Ed. Part 2)	24	48.0	19	38.0	7	14.0	
11 yrs + (Pri. Ed. Part I)	12	66.7	5	27.8	1	5.6	
Frequency of Comp. Use							λ^2(4)=1202; p = .002 p < 0.05*
Every day	44	51.8	34	40.0	7	8.2	
Every week	16	43.2	13	35.1	16	21.6	
Every year	1	12.5	7	87.5	0	0,0	
Purpose of Using Computer							
Education (assignments, researches etc.)	16	37.2	21	48.8	6	14.0	λ^2(4)= 12.16; p = .14 p > 0.05
Social Media (Facebook, MSN, twitter etc.)	39	52.0	29	38.7	7	9.3	
Other (shopping, payment, game, film, music, news)	6	66.7	1	11.1	2	22.2	
Total	61	46.9	54	41.5	15	11.5	

As shown in Table 3, the status of supporting using tablet computers in mathematics courses by candidate mathematics teachers did not differ significantly in terms of gender, years, the status of having a computer, the period of using a computer and the purpose of using a computer. However, a significant difference was found between the views of candidate teachers in terms of frequency of using a computer [λ^2(4)=12.02; p<.05].

The relation between the status of feeling a need for an in-service training course over using tablet computers in mathematics courses by candidate mathematics teachers and their computer attitude scores was examined. The main tendency and main changing measurement values of the views of candidate teachers in this issue were given in Table 4 and Table 5.

Table 4. ***The Main Tendency and Changing Measurements of Candidate Mathematics Teachers Regarding Computer Attitude Scores***

The status of feeling a need for an in-service training course on using tablet computer	N	$\overline{X}$	S
Yes	86	2.9868	.28312
No	37	2.9361	.30519
No idea	7	2.8571	.20735
Total	130	2.9654	.28635

As shown in Table 4, the arithmetical mean of the computer attitude scale total scores of the candidate mathematics teaches participating in the research and feeling a need for an in-service training course on using tablet computers was ($\overline{x}$) 2.99 and the scores of those not feeling a need for an in-service training course was ($\overline{x}$) 2.94 and the scores of the ones having no idea was found as ($\overline{x}$) 2.94.

A one way variance analysis (ANOVA) was carried out for unrelated measurements over whether computer attitude scale total scores of the candidate teachers participating in the research differed, and given in Table 5.

Table 5. ***One Way ANOVA Results for the Unrelated Measurements with regard to Computer Attitude Scores of Candidate Mathematics Teachers***

Source of Variance	Total Square (TS)	Sd	Mean Squares (MS)	F	P	Significant Difference
Intergroup	.153	2	.077			
Intragroup	10.425	127	.082	.933	.396	No
Total	10.578	129				

1-Yes, 2- No, 3-No Idea

As given in Table 5, no difference was found between the computer attitude scale total scores of the candidate mathematics teachers feeling a need for an in-service training course on using tablet computers in mathematics course and the scores of those not feeling a need for an in-service training [F(2-127)= .933, p>.05].

The status of feeling a need by mathematics teachers for an in-service training course over using tablet computers in mathematics courses was examined in terms of some variables and given in Table 6.

Table 6. ***The Distribution of the Status of Feeling a Need by Mathematics Teachers for an In-Service Training Course over Using Tablet Computers in Mathematics Courses in Terms of Different Variables***

Variables	Status of the supporting using tablet computers						Sig. Diff.
	Yes		No		No Idea		
	f	%	f	%	f	%	
Gender							$\lambda^2(2)=9.326$; p = .009 p< 0.05
Man	19	47.5	17	42.5	4	10.0	
Woman	67	74.4	20	22.2	3	3.3	
Year							$\lambda^2(2)=3.856$; p= .145 p > 0.05
	42	70.0	13	21.7	5	8.3	
	44	62.9	24	34.3	2	2.9	
1st Year							$\lambda^2(2)=2.966$; p = .227 p > 0.05
2nd Year	60	63.8	27	28.7	7	7.4	
Status of having a computer	26	72.2	10	27.8	0	.0	
Period Using Computers							$\lambda^2(6)=1.050$; p= .984 p > 0.05
1-4 yrs (university)	10	62.5	5	31.3	1	6.4	
5-7 yrs (High School)	29	63.0	15	32.6	2	4.3	
8-10 yrs (Pri. Ed. Part 2	34	68.0	13	26.0	3	6.0	

11 yrs + (Pri. Ed. Part I)	13	72.2	4	22.2	1	5.6	
Frequency of Comp. Use							$\lambda^2(4)=6.309$; p = .177 p > 0.05
Every day	51	60.0	29	34.1	5	5.9	
Every week	30	81.1	5	13.5	2	5.4	
Every year	5	62.5	3	37.5	0	.0	
Purpose of Using Computer							
Education (assignments, researches etc.)	28	65.1	12	27.9	3	7.0	
Social Media (Facebook, MSN, twitter etc.)	52	69.3	19	25.3	4	5.3	$\lambda^2(4)= 9.046$; p = .338 p > 0.05
Other (shopping, payment, game, film, music, news)	6	66.7	3	33.3	0	.0	
Total	86	66.2	37	28.5	7	5.4	

As given in Table 6, the status of feeling a need by candidate teachers for an in-service training course over using tablet computers in mathematics courses did not differ in terms of year, the status of having a computer, the period of using a computer, frequency of computer use and purpose of computer use. However, the views of candidate teachers were found significantly different in terms of gender [$\lambda^2(2)=9.326$; $p<.05$].

The views of the candidate mathematics teachers over the advantages and disadvantages of using tablet computers in mathematics courses were examined and the frequency levels were given in Table 7 and Table 8.

Table 7. ***The Frequency Distribution of the Views of the Candidate Mathematics Teachers over the Advantages and Disadvantages of Using Tablet Computers in Mathematics Courses***

Advantages	**Candidate Teacher**	
	f	**%**
1.It could make mathematics course more enjoyable with visuals and animations	108	83.1
2. It could facilitate the perception of abstract concepts in mathematics course.	69	53.1
3. It could increase the interest of students in mathematic courses	55	42.3
4. It could enable students to make mathematical assessments and evaluations easier.	54	41.5
5. It could enable students to achieve mathematical issues they wonder about in a short time.	54	41.5
6. It could give more time to teachers for mathematical activities.	53	40.8
7. It could increase the skills of students to use technological tools.	49	37.7
8. It could increase the active involvement of students in mathematics courses	46	35.4
9. It could enable students to make researches and investigations on mathematics courses.	46	35.4
10. It could help with demonstrating the activities that cannot be employed through animations.	44	33.8
11. It could increase the permanence of learning by making mathematics courses more efficient.	41	31.5
12. It is easy to carry and could relieve students of course books.	41	31.5
13. It could increase the interests of students in scientific and technological developments.	30	23.1
14. It could enable students to review the topics in mathematic courses.	28	21.5
15. Tablet computers could increase the usage of such various	27	20.8

programs and software as "ME vitamin" in teaching.		
16. It could increase the communication of students with teaches in mathematics courses	17	13.1

As shown in Table 7, over using tablet computers in mathematics courses, 108 (83.1%) candidate mathematics teachers stated that it would make the courses more enjoyable with visual materials and animations. This shows that a great majority of the participants has this opinion. Sixty-nine candidate teachers (53.1%) pointed out that it could facilitate the perception of abstract concepts in mathematics course. In addition, candidate teachers expressed in the least frequency and percentage (f =17; 13.1%) that it would be an advantage to use it in mathematics course in terms of increasing communication with teachers.

Table 8. ***The Frequency Distribution of the Views of the Candidate Mathematics Teachers over the Disadvantages and Disadvantages of Using Tablet Computers in Mathematics Courses***

Disadvantages	**Candidate Teacher**	
	f	**%**
1. It could lessen the communication between students and mathematics teachers.	62	47.7
2. It could decrease social interaction between students.	56	43.1
3. It could encourage students for a ready-made knowledge in mathematics courses.	45	34.6
4. The radiation sent off by tablet computers could harm (eye etc.) health.	38	29.2
5. It could worsen the writing skills of students in mathematics courses.	34	26.1
6. Students could break down tablet computers in a short time.	32	24.6
7. Tablet computers could be used out of their purpose.	26	20.0
8. It could create a habit of laziness at mathematics teachers.	24	20.0
9. Individual differences between students could cause problems in the process of using tablet computers.	20	18.5
10. It could prevent student skills to be realized by candidate teachers.	17	13.1
11. It could lessen the interest in science and technology and published books.	15	11.5
12. Broken tablets could hinder teaching of mathematics course.	11	8.5
13. It could affect the skills of students in commenting scientific events negatively.	10	7.7
14. Classroom management of the teacher could be difficult.	9	6.9
15. Carrying and protecting tablet computers could be difficult.	4	3.1

As given in Table 8, candidate teachers participating in the research stated that in the case of using tablet computers in mathematics courses some disadvantages could come out. The leading one of these disadvantages was the view of "It could lessen the communication between students and mathematics teachers" (f =62; 47.7%). Fifty-six of the candidate teachers (43.1%) pointed out that "It could decrease social interaction between students". Forty-five of the candidate teachers (34.6%) stated that it could encourage students for a ready-made knowledge. Thirty-eight of candidate teachers expressed that the radiation sent off by tablet computers could harm (eye etc.) health, while 34 of them pointed out that it could worsen the writing skills of students in mathematics courses. In addition, candidate teachers pointed out that carrying and protecting tablet computers could be difficult, with the least frequency and percentage (f =4; 3.1%).

DISCUSSION, CONCLUSIONS AND SUGGESTIONS

The findings obtained in this research differed significantly in terms of the status of candidate mathematics teachers' supporting using tablet computers in mathematics courses, the period of using a computer and the purpose of using a computer. These results were parallel with the result in the study carried out by Uzoğlu & Bozdoğan (2012) for the variables of gender, working status and the status of having a computer. In addition, in another study by Daşdemir et al., carried out with teachers a similarity was found with the current study in terms of gender, professional experience and the status of having a computer. However, a significant difference was found in terms of the status of candidate teachers' supporting using tablet computers in mathematics courses and

the frequency of using a computer. Depending on this result, as the frequency of teachers' using a computer increased, their status of supporting using a tablet computer increased. In addition, a significant relation was found between the candidate mathematics teachers with a high attitude of computer and those with a low attitude of computer over supporting tablet computer usage in secondary school mathematics courses. And this result is in line with the result obtained by Uzoğlu and Bozdoğan (2012).

In the findings obtained in another dimension of the research, no significant difference was found in terms of the status of feeling a need for using tablet computers in mathematics courses, year, period of using a computer, frequency of using a computer and the purpose of using a computer. This result is parallel with the results of period of using a computer and the purpose of using a computer in the study by Uzoğlu and Bozdoğan (2012). In addition, no difference was found between the scores of the candidate mathematics teachers feeling a need for an in-service course, those of the ones feeling no need and the ones having no idea.

Candidate mathematics teachers indicated the first three advantages of using a tablet computer in mathematics courses would be "It could make mathematics course more enjoyable with visuals and animations", "It could facilitate the perception of abstract concepts in mathematics course" and "It could increase the interest of students in mathematic courses" while the item "It could increase the communication of students with teaches in mathematics courses" was the one thought to be the least advantageous. In their study, İnan et al. (2010) pointed out that students participated in classroom activities when they used computers while studying. In another study, Kyun end Lee (2009) found that students are more willing and effective in computed based learning.

On the other hand, candidate teachers pointed out that there might be some disadvantages in the case of using tablet computers in mathematics courses. The first three were "It could lessen the communication between students and mathematics teachers", "It could decrease social interaction between students" and "It could encourage students for a ready-made knowledge in mathematics courses", while the item "Carrying and protecting tablet computers could be difficult" were the least advantageous one. The advantages and disadvantages of using tablet computers in mathematics courses are in line with the results of the research by Uzoğlu and Bozdoğan (2012) and those of the current study. In the light of the study, the followings were recommended.

1. In this study, only the variables of computer attitude, gender, age, the status of having a computer, the period of using a computer, the purpose of using a computer were investigated. The arrangement of the studies to be carried out in the future in a way to include more variables would make more contribution to academic studies. In addition, some sampling should be chosen from private universities as well as state universities.
2. Collecting data from the candidate teachers studying in other Faculties of Education over using computers in educational settings would be beneficial in this process.
3. The sampling of the current study was comprised of 130 candidate mathematics teachers. Therefore, some other researches could be carried out with the working groups to be made up of different candidate teachers and the relations between them could be investigated.
4. Tablet computers have not been used in all of the schools. The academic success of tablet computers could be investigated after the completion of Fatih Project.

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