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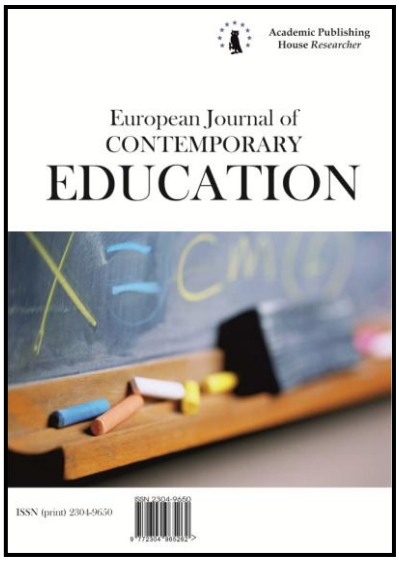

Students' Opinions on the Use of Tablet Computers in Education

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Abstract

One of the most important tools for the integration of ICT in education, especially with tablet computers, has been employed in Turkey through the FATIH Project. This study aimed to determine students' views on the use of tablet computers in learning and teaching processes. Eighty-four first-year high school students studying at three schools in service within the scope of the FATIH Pilot Project were selected as the sample of this study. The quantitative data obtained were gathered using the "Questionnaire for Students' Opinions on the Use of Tablet Computers". The Cronbach's alpha coefficient for the whole questionnaire has been measured at .82. Frequency, percentage, and arithmetic mean values have been used for the data analysis. It was found that students mostly use tablet computers to access the Internet. Students stated that the content presented on tablet computers supports the topics in textbooks and that teachers encourage them to use tablet computers in the learning and teaching process. The students also agreed that tablet computers weaken communication between students and teachers. Most of the students stated that, during the teaching process with the use of tablet computers, they do not learn more quickly and easily, they have some difficulty understanding topics, learning is not permanent, and it does not contribute to increasing their level of success. Most of the students expressed that, when they study with tablet computers for a while, they face some adverse physical effects such as headache and eyestrain, and they are worried about radiation.

Keywords: FATIH Project, tablet PC, information technologies.

Introduction

In recent years, many new projects have been conducted to promote the integration of the Internet and information technologies into education all over the world. Apple's "Classes of the Future" of the 1980s, the USA's "Preparing Tomorrow's Teachers to Use Technology", Portugal's

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"Magellan" project that aims to obtain a laptop computer for each student, and South Korea's project to grant tablet computers to all students can be categorised as examples within this framework (Le Ber, Lombardo & Quilter, 2008; Pamuk, Çakır, Yılmaz, Ergun & Ayas, 2013; Weitz, Wachsmuth & Mirliss, 2006).

In the Turkish education system, projects to incorporate the use of computer technologies in education were launched with the 1st and 2nd Phases of Basic Education project conducted between 1998 and 2007 within the scope of the Basic Education Development Project and were expedited with the establishment of information technology (IT) classes at schools. Within this process, the Ministry of National Education established 7,100 IT classes at 5,800 schools throughout the country to improve the quality of teaching and learning and equipped the classes with computers, delineascopes, and multimedia devices. At the schools within the scope of aforementioned project, subsequent to realising the former aim of skill-building in the use of IT, a new process emerged in terms of the more efficient use of IT tools in all classes with the FATIH Project, which is the "Increasing Opportunities and Improvement of Technology Movement" (Aytaç & Sezgül, 2012). As a milestone in the integration of technology into education, tablet computers have become the most significant agenda topic in education with the FATIH Project and brought discussions on their contribution to educational outcomes.

FATIH Project in Education

The main objective of the FATIH Project, which is carried out by the Ministry of National Education, is to provide equality of opportunity in education and improve the technology used at schools. This project consists of five basic components: a) to provide hardware and software infrastructure, b) to provide and manage educational e-content, c) to use efficient information technologies in the curriculum, d) teachers' in-service training, and e) the use of conscious, secured, manageable, and measurable information technologies (MEB, 2012). The objective intended to be achieved within this project is to grant tablet computers to approximately 700,000 teachers and 17 million students, to set up LCD panel-type interactive whiteboards in 570,000 classes and 42,000 schools and to provide a Web platform that can respond to the need, together with multifunctional printers, cameras, and relevant documents. According to data from the Ministry of National Education, tablet computers have been granted to 2,259 teachers and 9,435 students in 17 different provinces and 52 schools (48 secondary and four primary schools), and classes of 5th and 9th grade students have been equipped with interactive whiteboards since the beginning of a pilot scheme started in the second semester of the 2011-2012 academic year (MEB, 2012).

It is becoming more and more important to identify students' understanding of tablet computers in terms of education, their intended purposes in using these devices, and challenges encountered within this process to materialise FATIH Project in an efficient way, to achieve optimum success in educational outcomes, and to ensure efficient use of the resources. The current study aimed to identify students' opinions on the use of tablet computers and the challenges encountered. It is thought that the study will be beneficial in terms of both its positive responses within the implementation process and contributions to the literature. Moreover, previous studies conducted at the schools chosen for the pilot scheme of the FATIH project are considered inadequate (Pamuk et al., 2013). Given the IT integration into a huge multidimensional and macro-size education system, elaborative analysis of this project becomes more of an issue.

Because the FATIH Project also includes the integration of technology into educational processes, further analysis on the efficiency of tablet computers in education, particularly in terms of hardware properties, and the identification of possible challenges within the process becomes significant (Aytaç & Sezgül, 2012; Bozdoğan & Uzoğlu, 2012). Kaya and Koçak (2011) stated that the FATIH Project is at risk of being regarded as costly and ineffective in terms of its contribution to the education system. As for school principals, it is thought that students can develop negative attitudes and concerns towards tablet computers and interactive whiteboards and that there is a need to create new policies to prevent this possible problem (Dursun, Kuzu, Kurt, Güllüpınar, & Gültekin, 2012). In another study, it was determined that almost half of the teachers (46%) believed that the aforementioned project would not attain its goals, while the other half believed quite the contrary (Çiftçi, Taşkaya & Alemdar, 2013). As indicated by the results of the study, there is a difference in teachers' thoughts on the future of the FATIH Project.

Relevant Studies

Tablet computers were granted to students between the ages of 5 and 15 in Scotland through a pilot scheme in 2011, and it was observed that tablet computers together with access to the Internet facilitates access to information (Dailyrecord, 2010). It was observed in a study related to the use of tablet computers handed out to 1,250 primary school students in Switzerland that tablet computers could be used as efficient educational materials and that students' attitudes were positive towards this technology (Fri-tic, 2012). According to Weitz, et al. (2006), students stated that they would prefer using tablet computers in classes and that these devices improved the quality of the learning process. However, the researchers expressed the need for further analysis on whether students' thoughts were based on the positive effects of these devices or just because they were a novelty. Stickel (2009) expressed that study enrichment (enriched e-books) was a significant variant in the efficient use of tablet computers in education.

According to Aydemir, Küçük, and Karaman (2012), Balcı (2013), Enriquez (2010), Gündüz, (2010), Aksal (2011), Delen and Bulut (2011), Fister and McCarty (2008), Güzel (2011), and Kenar (2012), the use of tablet computers has increased students' interest and eagerness to learn and provided a rich teaching environment for teachers. Amelink, Scales and Tront (2012) showed that tablet computers have increased class participation too. It was also identified through the studies of Balcı (2013), Gündüz (2010) that students mostly use tablet computers for Internet, communication, games, e-books and participation to virtual classes. At Southern Queensland University, tablet computers were given to 383 and 406 students in both 2008 and 2009 respectively. Students using and not using tablet computers were observed for a whole academic year and compared in terms of the variants relevant to participation and success. A significant difference was identified in success of tablet users who had low, medium, and high socio-economic backgrounds. The increase in the success of tablet users from low socio-economic backgrounds was identified as higher than others' (Phillips & Loch, 2011).

Two hundred eighty students were involved in Stickel's (2009) study, and 90% of those students stated that tablet computers were beneficial, particularly in terms of their visual and multimedia properties. In addition, 81% of the students stated that they found that the use of tablet computers in class was more entertaining and enjoyable than the use of conventional blackboards. It was stated by Betcher and Lee (2009) that the use of tablet computers had to be planned properly to make a difference for both teachers and students.

Pamuk et al. (2013) found through class observations that some of the students did not use tablet computers for the intended purpose and could not focus on the class, as they played games with the devices. It was also found that some of the teachers did not want to use tablet computers during classes because they distracted students' attention and motivation.

Identifying students' opinions on the use of tablet computers in educational processes, this study will provide feedback to decision-makers and executors of the FATIH Project within the implementation and popularisation processes. It is also thought that an analysis of students' opinions, particularly prior to the implementation of such a project, which has high risk in terms of applicability and cost with all the components such as tablet computers, interactive whiteboards, Internet infrastructure, e-content, and teacher trainings, which are actually intended to be used to prevent digital inequality in the context of technology's integration into education, would be strongly beneficial in terms of either improving the quality of education or the efficient use of state resources.

The main objective of the study is to determine students' opinions on the use of tablet computers within learning and teaching processes. The following questions were developed for this purpose:

- Which properties of tablet computers are used most by students?
- What are the challenges encountered by students related to tablet computer use in learning and teaching processes?

Method

In accordance with the scope of this study, a descriptive survey model was used to obtain objective data from information sources. This model is considered an effective approach that aims to describe a current or retrospective situation (Karasar, 2008). The following part consists of

explanations on the subject of the study, the development of data collection tools and their properties, and the analysis of the data collected.

Working Group

The implementation range of the FATIH Project includes all high schools in Turkey; however, the Ankara province was chosen as the pilot area, and all participants in working group of the current study are students from this province. The chosen schools represent all types of schools throughout the country.

The working group of the study was formed by 131 1st grade high-school students (ranging in age from 14-15) from 2 Anatolian high schools, 1 Industrial Vocational High School and 1 Anatolian Religious High School which are in the scope of the FATIH Project's pilot scheme. A questionnaire was first conducted for 36 students studying at an Anatolian high school to determine the reliability of the questionnaire. Then, it was conducted with another 95 students and 84 (40 from boys and 42 from girls) of the questionnaires were taken under review after a preliminary examination.

Data Collection Tools

The data were collected through a questionnaire titled "Students' Opinions on the Use of Tablet Computers". An item pool was prepared after an analysis of the relevant literature. The questionnaire was prepared with the input of two computer and education technology experts and two computer teachers from the schools that would be analysed within the study. In the first part of this two-part questionnaire, students were asked about the properties of tablet computers they use most. The students' answers were categorised into seven areas. In the second part, which includes grading questions, students' agreement with ideas was determined with five different indicators ranging from "disagree" to "strongly agree". Grading questions are used to identify individuals' thoughts, attitudes, and behaviours (Aziz, 2010).

Experts from different universities were consulted to identify the validity of this questionnaire. First, experts in Turkish language education were consulted about the appropriateness of the questionnaire for determining students' opinions on tablet computer use and the clarity and sufficiency of explanations. In addition, two information technology experts and one assessment and evaluation expert were consulted in terms of whether the questions could evaluate students' thoughts or not.

Four classes in four different schools included in the pilot scheme were equipped with interactive whiteboards, and tablet computers were given to students. One of these four schools was chosen, and a reliability analysis of the questionnaire was conducted on its students. For this purpose, a pre-test was conducted on 36 1st grade students studying at an Anatolian high school included in the working group. The Cronbach's alpha reliability coefficient of the grading questions of the questionnaire was measured at .82. Values over .70 for Cronbach's alpha are regarded as adequate in terms of the reliability of the test (Büyüköztürk, 2007). Accordingly, it can be said that this questionnaire is reliable with respect to identifying students' thoughts.

Analysis of Data

The frequency, percentage, and mean values of the data obtained through the questionnaires were determined by a statistical software package, and the results are given in tables and figures. Equivalents of arithmetic means were measured with a 4/5 formula within the evaluation of the study results. According to this formula, arithmetic mean values of 1.00-1.79 were regarded as *never,* 1.80-2.59 as *rarely,* 2.60-3.39 as *normally,* 4.19 as *mostly*, and 4.20-5.00 as *completely.*

Findings and Comments

The properties of tablet computers used most by students are shown in Figure 1.

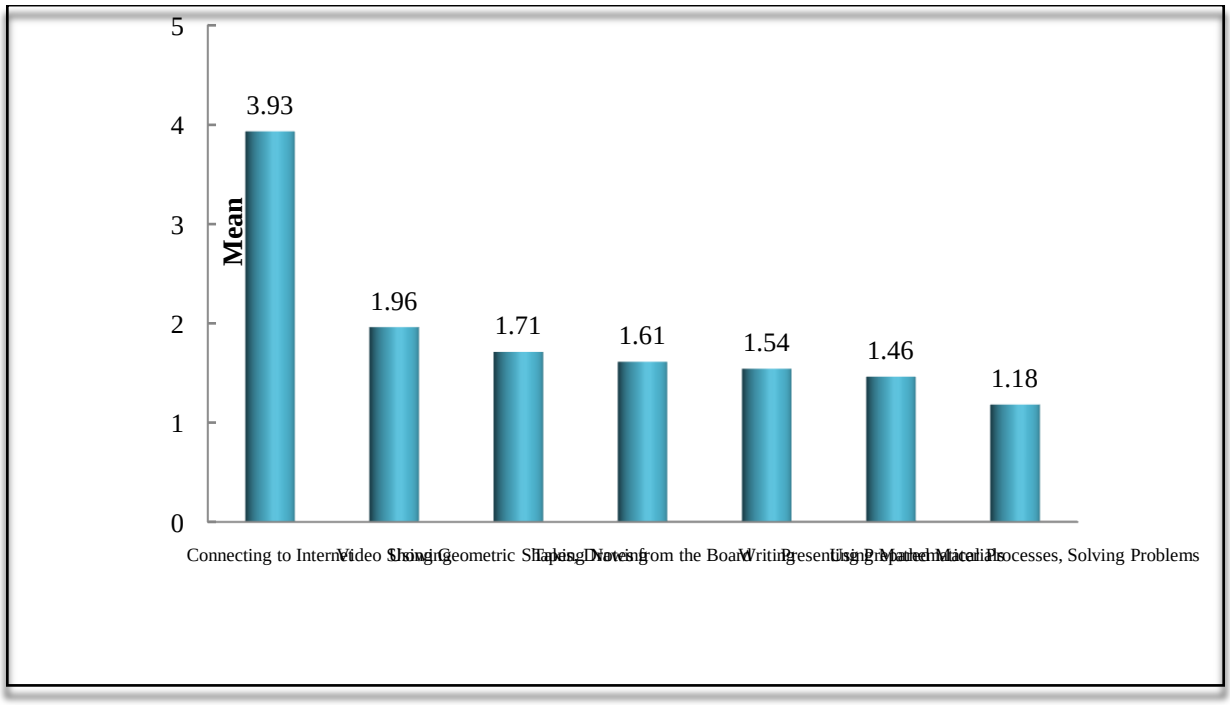

Figure 1. Properties of tablet computers used most by students

Students mostly use tablet computers to connect to the Internet and to view videos. The use of other properties (using geometric shapes and drawing, taking notes from the board, writing, presenting prepared materials, using mathematical processes, and solving problems) is rather rare. The agreement levels of students about tablet computers' contribution to learning and teaching processes are given in Table 1.

Table 1. Students' opinions on the use of tablet computers

Opinions on Tablet Computers	Never	Rarely	Normally	Mostly	Completely	$\bar{\chi}$	Agreement Level
1) I can learn easily when I use a tablet computer in class.	21	27	27	0	9	2.39	Low
	25.0	32.1	32.1	0	10.7		
2) Writings and drawings related to course subjects are more understandable with tablet computers.	24	15	9	18	18	2.89	Medium
	28.6	17.9	10.7	21.4	21.4		
3) I cannot learn when we use tablet computers because of the crowdedness of classes.	15	15	24	21	9	2.93	Medium
	17.9	17.9	28.6	25.0	10.7		
4) I like using tablet computers in classes.	9	30	15	9	18	2.96	Medium
	11.1	37.0	18.5	11.1	22.2		
5) Teaching and learning processes are more entertaining and enjoyable with tablet computers.	24	18	15	12	15	2.71	Medium
	28.6	21.4	17.9	14.3	17.9		

6) I can easily present my own presentations and content using tablet computers.	18	27	12	18	9	2.68	Medium
	21.4	32.1	14.3	21.4	10.7		
7) I have difficulty using tablet computers.	39	21	12	12		1.96	Low
	46.4	25.0	14.3	14.3			
8) Tablet computers encourage us to use the Internet.	3	6	18	18	39	4.00	High
	3.6	7.1	21.4	21.4	46.4		
9) Our teachers enable us to use tablet computers in classes.	6	6	18	27	27	3.88	High
	3.8	3.8	23.1	34.6	34.6		
10) Tablet computers improve my interest in and enthusiasm for lessons.	15	27	18	12	12	2.75	Medium
	17.9	32.1	21.4	14.3	14.3		
11) I cannot follow courses because they are taught too quickly with tablet computers.	18	12	15	15	24	3.18	Medium
	21.4	14.3	17.9	17.9	28.6		
12) I cannot make eye contact with the teacher when we use tablet computers.		3	15	18	48	4.32	Highest
		3.6	17.9	21.4	57.1		
13) Course content presented with tablet computers does not interest me.	18	15	30	9	12	2.79	Medium
	21.4	17.9	35.7	10.7	14.3		
14) I learn more quickly and easily with tablet computers.	21	24	21	9	9	2.54	Low
	25.0	28.6	25.0	10.7	10.7		
15) Subjects I learn through a tablet computer are not permanent.	9	12	15	27	21	3.46	High
	10.7	14.3	17.9	32.1	25.0		
16) I can use tablet computers efficiently in learning.	9	15	33	12	12	3.04	Medium
	11.1	18.5	40.7	14.8	14.8		
17) The interaction with the teacher decreases when I use a tablet computer.	3		24	9	45	4.15	High
	3.7		29.6	11.1	55.6		
18) Use of tablet computers increases our cooperation with my friends.	42	21	15		3	1.78	Disagreement
	51.9	25.9	18.5		3.7		
19) Courses would be more difficult if we did not use tablet computers.	51	15	18			1.61	Disagreement
	60.7	17.9	21.4				
20) Our teacher mostly sends his/her content to our tablet computers and enables us to prepare for lessons.		3	15	27	39	4.21	Highest
		3.6	17.9	32.1	46.4		

21) Our teacher encourages us to use tablet computers for learning.		12	15	27	24	3.81	High
		15.4	19.2	34.6	30.8		
22) I have a chance to learn one subject from different sources with a tablet computer.	15	6	18	15	30	3.46	High
	17.9	7.1	21.4	17.9	35.7		
23) Contents presented via tablet computers are complementary to course books.	6	3	15	36	24	3.82	High
	7.1	3.6	17.9	42.9	28.6		
24) I like using a tablet computer when I learn course content.	15	21	18	18	12	2.89	Medium
	17.9	25.0	21.4	21.4	14.3		
25) I have difficulty using tablet computers in class.	18	18	15	18	3	2.41	Low
	33.3	22.2	18.5	22.2	3.7		
26) Learning with tablet computers increases my success.	36	18	24	3	3	2.04	Low
	42.9	21.4	28.6	3.6	3.6		
27) I get eyestrain when I look at a tablet computer's screen for a while.	15	12	6	15	36	3.54	High
	17.9	14.3	7.1	17.9	42.9		
28) I can easily access to different materials (blogs, Wikipedia, Web pages) and show them to my friends via a tablet computer.	12	6	18	15	33	3.61	High
	14.3	7.1	21.4	17.9	39.3		
29) I do not write as much as before when I use a tablet computer in class.	6	6	15	15	42	3.96	High
	7.1	7.1	17.9	17.9	50.0		
30) My concentration is broken when I study with a tablet computer.	6	12	27	15	24	3.46	High
	7.1	14.3	32.1	17.9	28.6		

The agreement levels of students on the use of tablet computers in the learning and teaching process are given in Figure 2.

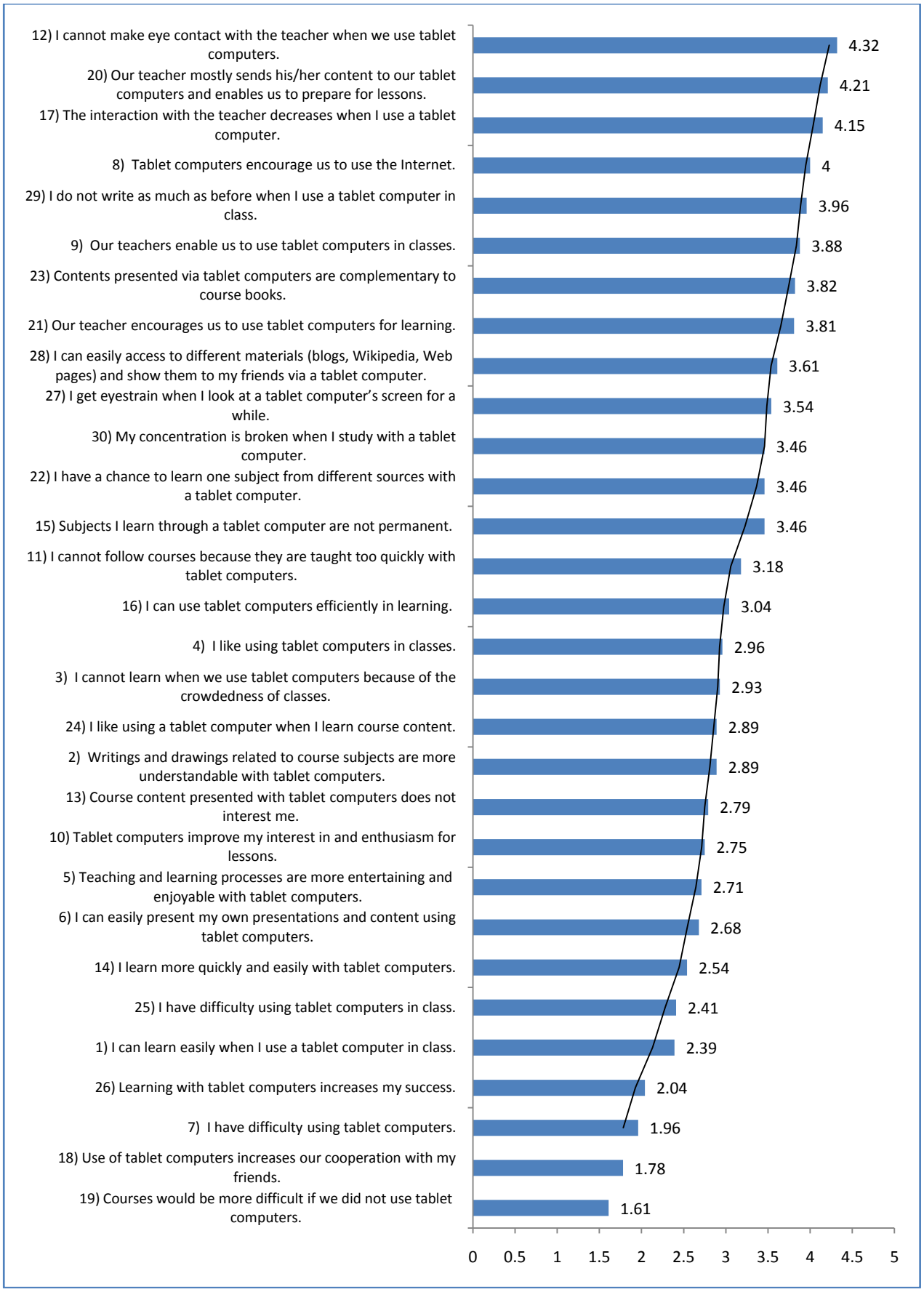

Figure 2. Agreement levels of students on the use of tablet computers

When the findings presented in Figure 2 are analysed, students' top level of agreement concerns the thought that tablet computers limit communication (eye contact) between teachers and students and that content prepared by teachers enables students to study with tablet computers. Students' agreement level is high for the thought that the use of tablet computers decreases communication between students and between teachers and students within the learning and teaching process.

Students have a high level of agreement for the thought that tablet computers enable them to present content prepared by both students and teachers, access the Internet (blogs, Wikipedia, Web pages), and study. In addition, most of the students stated that content presented via tablet computers complements the subjects in course books and that their teachers encourage them to use tablet computers in the learning and teaching process. A majority of students expressed that they start to experience eyestrain when they study with tablet computers for a while and that they lose attention when they use these devices during classes.

Most of the students stated that the use of tablet computers does not cause them to learn more quickly and easily, that they have difficulty understanding, that the subjects learned through the devices are not permanent, and that tablets do not contribute to their success. Almost half the students expressed that course content presented on tablet computers does not interest them and that they have difficulty following courses because they go too fast. In contrast, students' agreement level on having difficulty using tablet computers is low.

Students have a medium level of agreement on the thought that tablet computers increase their interest and enthusiasm for classes, enable them to learn from different sources, and make the learning and teaching process more entertaining and enjoyable. In contrast, students' low level of agreement on "understanding would be more difficult without the use of tablet computers" is highly significant, as it shows that their thoughts on the use of tablet computers are not quite positive. The lowest level of agreement was found for this thought. In one sense, it can be understood as indicating that students' need for tablet computers is rather low.

Discussion, Results, and Suggestions

The fact that students mostly use tablet computers for connecting to the Internet reveals the need to raise students' awareness in terms of conscious and reliable Internet use to prominence within the scope of the FATIH Project. Students think that tablet computers decrease communication between students and between students and teachers within learning and teaching processes. For this reason, both tablet computers and interactive whiteboards should be used properly during teaching and learning processes to avoid a negative effect on in-class communication. Students think that tablet computers encourage them to listen to the virtual teaching of these devices and restrain them in communicating with their teachers. Generally, the use of tablet computers in classes has negative effects on both in-class communication (student-student, student-teacher) and learning and teaching processes. According to Chen and Sager (2011), positive effects of the use of tablet computers in class were recorded. Although Işık and Çukurbaşı (2012) emphasised the fact that teachers would not have to cut off their face-to-face communication with students and that they would conduct in-class management in a better way, the findings of the current research assert the contrary.

Students stated that learning through tablet computers is not permanent because of the deficient and inadequate content presented and the fact that lessons are taught too fast to follow efficiently; this result shows a similarity with research conducted by Pamuk et al. (2013).

When the related literature is examined (Ertmer, Ottenbreit-Leftwich, Sadik, Sendurur & Sendurur, 2012; Hew & Brush, 2007), it can be seen that educational content is a significant component in the integration of technology. Through the findings obtained in the current study, it can be said that the content presented with tablet computers does not help students improve their success. In parallel with the results of Pamuk et al. (2013), it is thought that the use of tablet computers in classes decreases students' interest in and attention to the subject.

There is a need for the FATIH Project to create appropriate control mechanisms for applications to be used in tablet computers granted within the scope of this project for the good of the communication between teachers and students, as the aforementioned devices normally restrain this communication.

A majority of students stated that they experience eyestrain when they study with tablet computers for a while. Although tablet computers and interactive whiteboards were only used in two classrooms and in a limited way, they caused physical ailments in students such as headache and eyestrain. Students think that the use of tablet computers and interactive whiteboards together increases the amount of radiation inside classrooms, and they are worried about this issue. In one sense, this situation can be regarded a message about the use of different teaching methods and techniques together with tablet computers rather than continuous usage. It can be said that tablet computers should not be used in all classes and continuously.

Students' opinions on the use of tablet computers in classes are not quite positive. The results indicating that tablet computers affect in-class communication negatively and are an unusual implementation that have inadequate content show similarities with the findings obtained by Gill (2007) and Pamuk et al. (2013).

The fact that tablet computers are open to students' continuous use in out-of-class environments would ensure the continuity of the learning process. Tablet computers and interactive whiteboards should be complementary in both technical and pedagogical terms. Issues such as the radiation emitted by tablet computers, interactive whiteboards, mobile phones, and wireless Internet connections and the height of the SAR limit that will affect the physical and psychological health of students and teachers should be clarified. Required precautions should be taken in this respect. Reliable e-content should be used with tablet computers in accordance with the class levels stated in the Educational Information Network. Enriched e-books should be prepared for the FATIH Project to maximise the interaction between the material and the students.

Finally, we can say that there are inevitable responsibilities for institutions training prospective teachers and policy-makers in education. In our country, where sizeable investments have been made to implement major projects such as FATIH, the success of such projects in contributing to students' achievements depends greatly on well-trained teachers who will be able to use technology within the teaching process. For this reason, trainings should address not only teachers' content knowledge or knowledge of technology but also their technological pedagogical content knowledge (TPCK), which contains technological, pedagogical, and content knowledge together in itself.

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