



Implementing tablet PCs in schools: Students' attitudes and opinions



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ABSTRACT

In this study, the attitudes, expectations and views of 206 students in four high schools within the scope of the FATİH project in Turkey were assessed regarding tablet PC technology after six months of a pilot plan that included the distribution of tablet PCs to students. The research questions of this study are whether there is a meaningful difference between tablet PC use by male and female students and the effect of computer and Internet by students on attitudes toward tablet PC use. Qualitative and quantitative data collection tools were used in the research. The Computer Attitude Measure for Young students (CAMYS) developed by Teo and Noyes (2008) was used in evaluating the students' attitudes toward the tablet PC usage. Interviews were conducted with eight teachers at pilot schools concerning the integration of tablet PCs into their classes; the positive and negative dimensions of tablet PCs were analyzed. The findings indicate that students have a positive attitude toward tablet PCs. There was not a meaningful difference between the attitudes of male and female students toward tablet PCs. The length of computer and Internet by the students did not affect their attitudes toward tablet PCs. The ways that teachers used tablet PCs in classes, the positive and negative aspects of tablet PC usage and the students' expectations of tablet PCs were discussed in the study.

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1. Introduction

Computers have an active role at all educational levels today, and these devices are significant and indispensable dimensions of schools. Computers are beginning to be used effectively in education and learning environments, and computer use has different dimensions globally because of the spread of Internet use. Many countries aim at increasing the use of computers in education by making relatively high investments to increase the use of computer in schools (Organization for Economic Co-Operation and Development [OECD], 2001). The Australian government spent approximately 4.3 billion dollars on educational technology in 1999 and 2000. In America, the Department of Education spent more than 700 million dollars of its budget for educational technology (Hall & Higgins, 2005). According to the data of BECTA (2004) (British Educational Communications and Technology Agency), in England, 1 billion pounds were spent for educational technology products in 2001 and 2004.

Many investments have been made in Turkey for classroom educational technology tools. Since 1998, thousands of computers, projection devices, printers and other technology products have

been distributed, and there are many technology tools in primary schools and high schools in Turkey (Somyürek, Atasoy, & Özdemir, 2009). Considerable money has been spent on technology products in the scope of projects in Turkey. For the "Movement of Increasing Opportunities and Improving Technology", named the "FATİH project", that was started in 2010 by the Ministry of National Education (MNE) and will be completed in four years, 1.5 billion TL (approximately 750 million dollars) will be spent (MNE, 2010). In the scope of the project, smart boards, projection devices and computers will be distributed to all K-12 schools. The pilot plan began in the fall semester of 2011, and continued with the second stage of the project, the distribution of tablet PCs to students. At the end of the 2011 fall semester, 8500 tablet PCs were distributed to all the 9th grade students at 51 pilot high schools in Turkey (MNE, 2012). Approximately 400 teachers in the pilot schools were trained. In the tablet PCs that were distributed in scope of FATİH project. Electronic formats of all of the textbooks and 9th grade topic simulations were loaded onto the tablets, which have been updated regularly by MNE. The pilot scheme will be completed by 2014. After the pilot plan, tablet PCs will be distributed to all primary students (approximately 10,461,944), all secondary students (approximately 3,824,549) and all K-12 teachers (approximately 744,847) in the scope of the FATİH project (MNE, 2013).

The projects should be designed according to the views of students. In the pilot program, the attitudes and views of the students who use educational technology are as important as the

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distribution of the tablets. In studies of the educational use of computers, its effects on learners and their attitudes, teaching and the learning process should be researched (Morris, Gullekson, Morse, & Popovich, 2009; Teo & Noyes, 2008). Implementing computer and similar education technology products successfully to education system is connected to the acceptance of it and attitude towards it (Davies & Brember, 2001; Teo, 2006). Researchers researched the attitude towards computers as a critical factor in the acceptance of them in education (Huang & Liaw, 2005). Attitude towards computer is accepted to be a significant factor in the use of it in education (Myers & Halpin, 2002). Negative attitude towards the use of computer is accepted to be a deterrent factor in the use of computer in education (Teo, 2006). Briefly, efficiency of technology product in education is closely related to students' attitude towards them (Teo, Chai, & Lee, 2008).

1.1. Possible factors influencing computer attitudes

The literature reports factors that affect the attitudes of children towards computer (Ng & Nicholas, 2009; Sáinz & López-Sáez, 2010). Gender is the leading factor that determines these attitudes. Male students have more positive attitudes towards computers than female students (Colley, 2003; Comber, Colley, Hargreaves, & Dorn, 1997; Meelissen & Drent, 2008; Moore, 1994). It is hypothesized that male and female students have different attitudes because male students use computers on a greater larger scale (Van Eck & Volman, 2001). According to Robertson, Calder, Fung, and O'Shea (1995), among the reasons why female students have negative attitudes compared to male students is that female students have less interest and think that computer are less useful. According to Durndell and Thomson (1997), male students think that computers are more useful for them. Male students have more computers when the ratios of computers to children are taken into consideration, which supports the attitude difference between the sexes (Bovée, Voogt, & Meelissen, 2007). The family environment affects students' attitudes towards computers. In the families that have positive attitudes towards computer, children are affected positively (Shashaani, 1994).

Another factor that affects attitudes towards computers is "computer experience". Students that have use computers for a long time have positive attitudes towards computers (Moore, 1994). In the literature, it is mentioned that another factor that affects attitude towards computer is the ratio of using computer (Schumacher & Morahan-Martin, 2001). Because the Internet use of male students is higher than that of female students and they spend more time on computers playing games, their attitudes towards computers are more positive. Having a computer at home positively affects a student's attitude towards computer and computer use performance at school (Selwyn, 1998).

The major factors that affect attitudes towards computers are determined in the literature about the issue; but because of many reasons, including research and studies that were made in the previous years, increases in computer technologies, increases in Internet use, ease of the use of computer and ease of the buying a computer. It is impossible to know the factor and conditions of today about the use of computer. Some researchers have been adapting previously developed computer attitude scales into today's conditions (Morris et al., 2009; Teo & Noyes, 2008).

In terms of the acceptance and use of information technology (IT), several factors that influence educational technology use have been discussed in the literature (Teo & Noyes, 2008). According to Pelgrum (2001), the computer skills and knowledge of teachers are important determiners. Teacher demographics, such as age, gender, experience and personal factors, influence the efficient use of technology (Mohammed, 1994; Shapka & Ferrari, 2003). Gulbahar (2007), use of current hardware, software and suitable materials is

a key feature in user acceptance of technology. Technical support is another factor that influences technology use (Lim & Khine, 2006). Technical problems make it difficult to use technology in classrooms, and slow network performance and inadequate computers are an obstacle to using technology in education (Pelgrum, 2001). Conversely, Teo (2009) indicated that facilitating the conditions that affect integration to use technology tools indirectly. Even if users have access to well-supported infrastructures to use technology and technical support or a current device, they do not use technology more unless they possess positive attitudes toward it (Isik, 2009).

1.2. How do users come to accept and use a technology?

To investigate the factors influencing technology acceptance, Davis (1989) focused on internal factors such as awareness of benefits of IT tools, skills and/or a wide range of competencies to use a technology. Davis (1989) developed a model named the Technology Acceptance Model (TAM), which was extended in a number of different settings to explain user decisions of how and when to use a technology. The origins of the TAM came from Fishbein and Ajzen's (1975) Theory of Reasoned Action (TRA). TAM is less general than TRA and it provides a basis for attitude measures with two technology acceptance variables: perceived usefulness (PU) and perceived ease of use (PEU). PU refers to "the degree to which a person believes that using a particular system would enhance his or her job performance" (Davis, 1989, p. 320). PEU is defined as "the degree to which a person believes that using a particular system would be free from effort" (Davis, 1989, p. 320). Research has shown that TAM has been one of the most influential models in explaining user acceptance of IT, and it has gained wide attention in the IT literature because it includes the psychological interaction of a user with technology (Isik, 2009). According to TAM, if users perceive a technology as useful and easy to use, they develop positive attitudes towards the technology.

TAM suggests that PEU and PU are the two most important factors that must be considered in technology use (Legris, Ingham, & Collette, 2003). More recently, Teo, Chai, Hung, and Lee (2008) conducted a comparative study and found that PEU and PU are significant determiners of Malaysian and Singaporean pre-service student intention to use technology. Similarly, Ngai, Poon, and Chan (2007) indicated that the PEU and PU are the main factors affecting the attitude of students in the use or technology. These findings explain why certain instrument developers consider these two important factors in the development of computer attitude surveys (Teo & Noyes, 2008).

1.3. Purpose of the study

The tablet PC user rate has increased in recent years, and sales continue to gain momentum (Statista, 2013). Tablet PC use for educational purposes has become widespread globally and the tablet PC has the potential to alter the educational process. This technology provides unique characteristics that provide educational benefits for teachers and students (Dündar & Akçayır, 2012). Many researchers have suggested the use of graphic tablets or tablet PCs as a supportive tool in the classrooms, however, there have been few studies focusing on the attitudes of users (Dündar & Akçayır, 2012; Galligan, Loch, McDonald, & Taylor, 2010; Loch & Donovan, 2006; Olivier, 2005).

Many developed and developing countries have allotted substantial amounts of money, time and energy into attempting to integrate IT into their educational systems in the expectation that new generations of students will learn to use these technologies effectively, critically, productively and creatively (World Bank, 1995). In Turkey, the government has invested extensive amounts

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